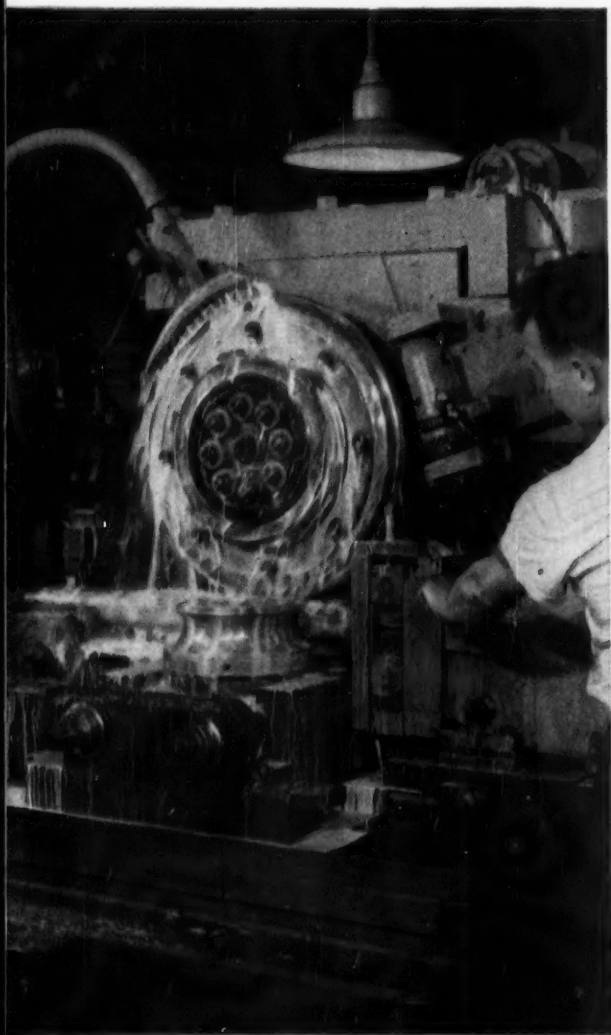


Chemical Week



CPI earnings set new high in second quarter; strikes dim next quarter's hopes . . . p. 21

◀ ***Welded tubing gains equipment market p. 33***

Sales manager for a month—Monsanto tests its salesmen in manager's role . . . p. 38

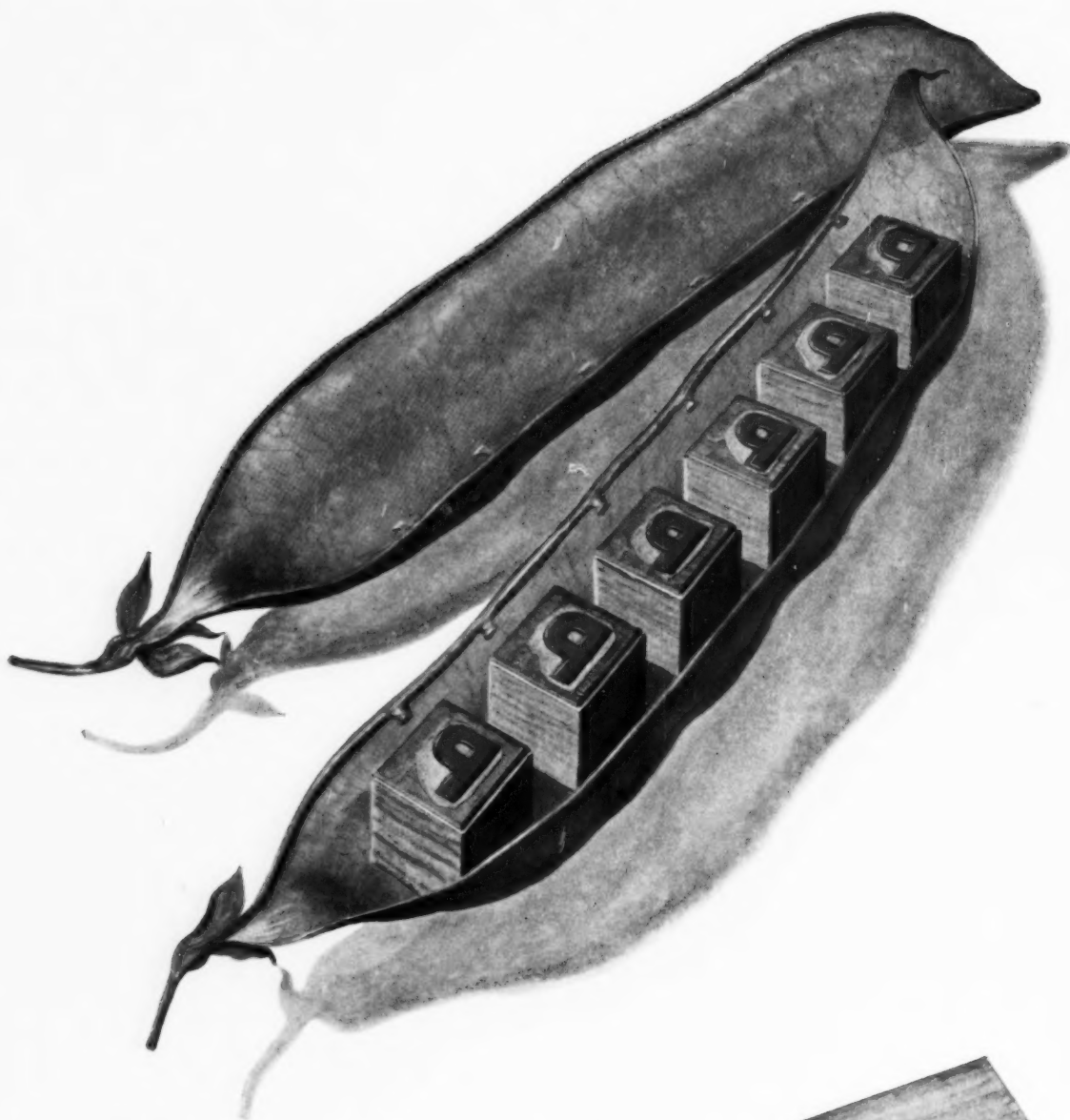
First look at Spevack patents shows three ways to save on heavy-water output . . . p. 45

Acrylates excess—new Dow plant will put U. S. capacity at twice current sales . p. 60

August 1, 1959

STEVEN RICE
UNIVERSITY MICROFILMS
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its



Like P's in a Pod...

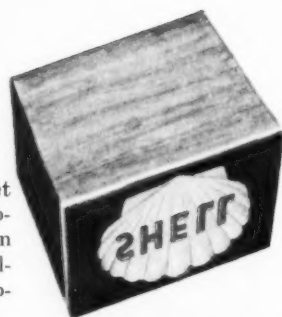
Today, not only P's, but A's and B's, words and pictures too, leap into print miles apart looking *exactly* alike. *Duplicate* printing plates turn the trick, but these chunks of heavy metal take muscle and money to ship and handle.

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is one
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TOP OF THE WEEK

AUGUST 1, 1959

- ▶ **American Cyanamid launches global expansion plans** that have been two years in preparationp. 23
- ▶ **Solid propellant made from a plastisol** is now offered by Atlantic Research for variety of usesp. 48
- ▶ **Dairies buy \$50-million worth of specialty cleaners;** one trend—wider use of liquid detergentsp. 54
- ▶ **Western Petrochemical planned for growth** before it was formed. Here's how the firm did itp. 63

9 VIEWPOINT

9 OPINION

11 MEETINGS

21 Chemical companies' sales and earnings rocket to new peaks, but profit margins still lag '56 levels. Question: Will steel strike drag down from next quarter earnings?

22 Pulp and paper companies hatch a brood of multi-million-dollar expansion projects. Stimuli: Current high production budget, long-range market forecasts.

23 Polypropylene maker AviSun will get its feedstock from one of its parent companies. Sun Oil will put up a \$2 million high-purity propylene unit at its Marcus Hook refinery.

23 American Cyanamid will spend \$13 million to beef up its overseas operations. While most of its present foreign activities are in pharmaceuticals, new investments will be split 50-50 between drugs and specialty chemicals.

27 WASHINGTON NEWSLETTER

33 PRODUCTION

Welded tubing—lower cost than seamless—in heat exchangers is getting wide use.

34 Chemical industry safety mark for '58 isn't as good as '56 record, according to National Safety Council.

38 SALES

Monsanto gives its salesmen a three-week tryout in the sales manager's job. Stint opens salesmen's eyes to managerial problems, gives management a look at promotion prospects.

43 TECHNOLOGY NEWSLETTER

45 ENGINEERING

Spevack patent reveals novel heat-conservation techniques that slashed heavy-water production costs.

48 RESEARCH

Atlantic Research Corp. shows off cost-saving idea for solid-propellant production. Key: plastisol base for casting, extrusion.

49 Avco's portable high-temperature plasma heat generator gives researchers 12,000 F temperatures.

51 MARKET NEWSLETTER

54 SPECIALTIES

\$50-million worth of chemical specialties each year go to dairies for cleaning equipment. Here's what they buy, how they buy it.

60 MARKETS

New acrylate expansions are spurred by growing demands for water-thinned paints — but U.S. capacity will soon be nearly twice current sales.

63 ADMINISTRATION

"Preorganization" proves key to smoothing Western Petrochemical Corp.'s changeover from company division to independent corporation.

64 Supreme Court turns down Spevack's latest attempt to get government information on Dana heavy-water plant.

68 BUSINESS BENCHMARKS

COVER PHOTO COURTESY BABCOCK AND WILCOX

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No. 5**

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FLUIDICS

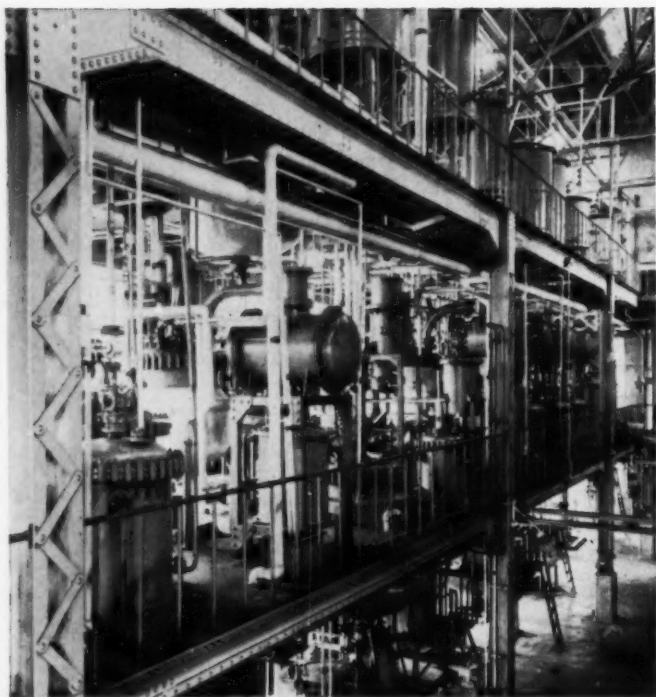
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FLUIDICS AROUND THE WORLD

Glasteel goes to work for Japanese pharmaceutical house

Most of the equipment you see in this picture is Glasteel, made by our Japanese affiliate, Shinko-Pfaudler. The plant belongs to Takeda Pharmaceutical Industries, Ltd., in Osaka, Japan. The plant produces vitamins, antibiotics, depressants, stimulants, nutritives, hormones, and other pharmaceuticals, as well as industrial chemicals and chemicals for brewery and agricultural use. Takeda is also associated with American Cyanamid in the production of chlortetracycline and is co-owner of Japan Lederle.

The gist of this story is that you'll find Pfaudler Glasteel and FLUIDICS at work around the world . . . and for pretty much the same reasons as here at home . . . for corrosion resistance, cleanliness, and sound answers to process problems involving fluids.



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Each is a sample about the size of a half-dollar of one of the metals mentioned.

A handy brochure accompanying each sample coin spells out the metal's particular virtues and possible areas of application, as well as Pfaudler's new abilities in fabricating.

We've already had considerable experience with all three metals, experience which has enabled us to fabricate production-size equipment from them.

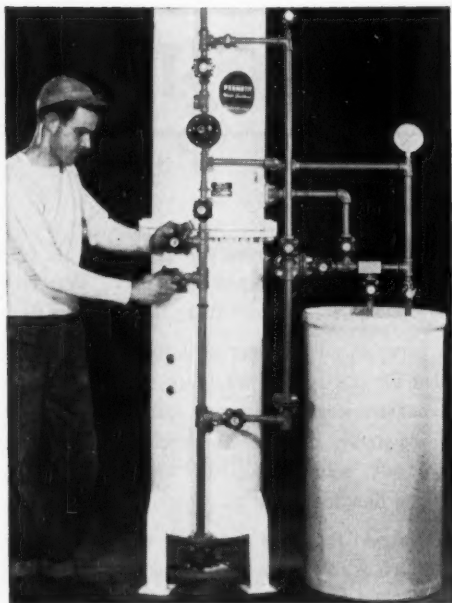
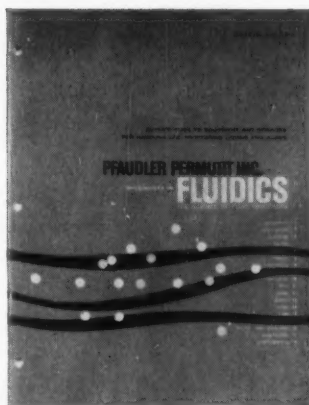
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Here is your ready reference to the equipment and engineering services encompassed by the FLUIDICS program. It offers you a single source of supply—a single point of responsibility for solving your problems involving fluids.

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For your copy, write for Bulletin No. 980.



FLUIDICS AT WORK

Packaged mixed-bed demineralizer, MBD-15, is compact and fast

Here's a low-cost way to demineralize 6 to 7½ gallons of water per minute to an average conductivity of 0.15 microhms . . . that's about 6,000,000 ohms specific resistance per cm or 0.05 ppm total electrolyte content. The unit also reduces CO₂ to 0.1 ppm and SiO₂ to about 0.1 ppm.

Capacity between regenerations is about 20,000 grains total electrolytes. It will demineralize 3420 gallons of water containing 100 ppm total electrolytes, or 1710 gallons containing 200 ppm. The resin bed can be easily regenerated without removing resins from the tank.

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For complete information on all these demineralizers, write for bulletins.



FLUIDICS AT WORK

New E Series Reactors incorporate many improvements

The many improvements in materials and designs listed here are now standard on the Pfaudler E Series Clamped-Top Reactor, which runs from 50- to 2000-gallon capacity.

Glaesteel 59 construction. All E Series Reactors are now made with Glaesteel 59. This has all the corrosion resistance of previous Glaesteels . . . practically unlimited resistance to all acids except hydrofluoric at temperatures up to 350 F. and to most alkalis at mild temperatures. And you also get 30% greater thermal shock resistance than with other glassed-steel constructions, along with a 20% increase in abrasion resistance.

New drives. On smaller sizes you get the new "W" Drive, a worm gear drive for either fixed- or variable-speed performance. Available with V-belt primary reduction or enclosed double reduction gearing. Hydraulic model available for explosion-proof operation or where wide variable-speed range is desired.

On the 1000- to 2000-gallon sizes, our new BH Drive is now standard. This new bevel gear drive has many refinements which cut operating and maintenance expenses by as much as 50%. Among the refinements are a higher critical agitation speed and a wider bearing spread.

Seals or stuffing boxes are available for both drives.

New accessories. New, one-piece, all-glassed interior flush valve. New, glassed ductile-iron pipe fittings. Jacket agitating nozzles and thermowells.

The complete story on the E Series Reactors and accessories is told succinctly in Bulletin 971.

FLUIDICS AROUND THE WORLD

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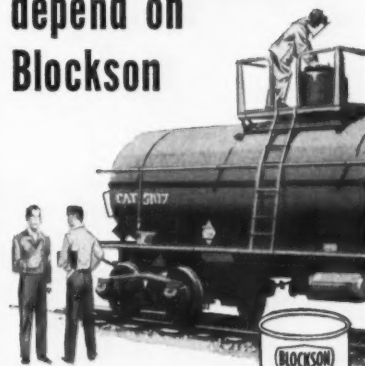
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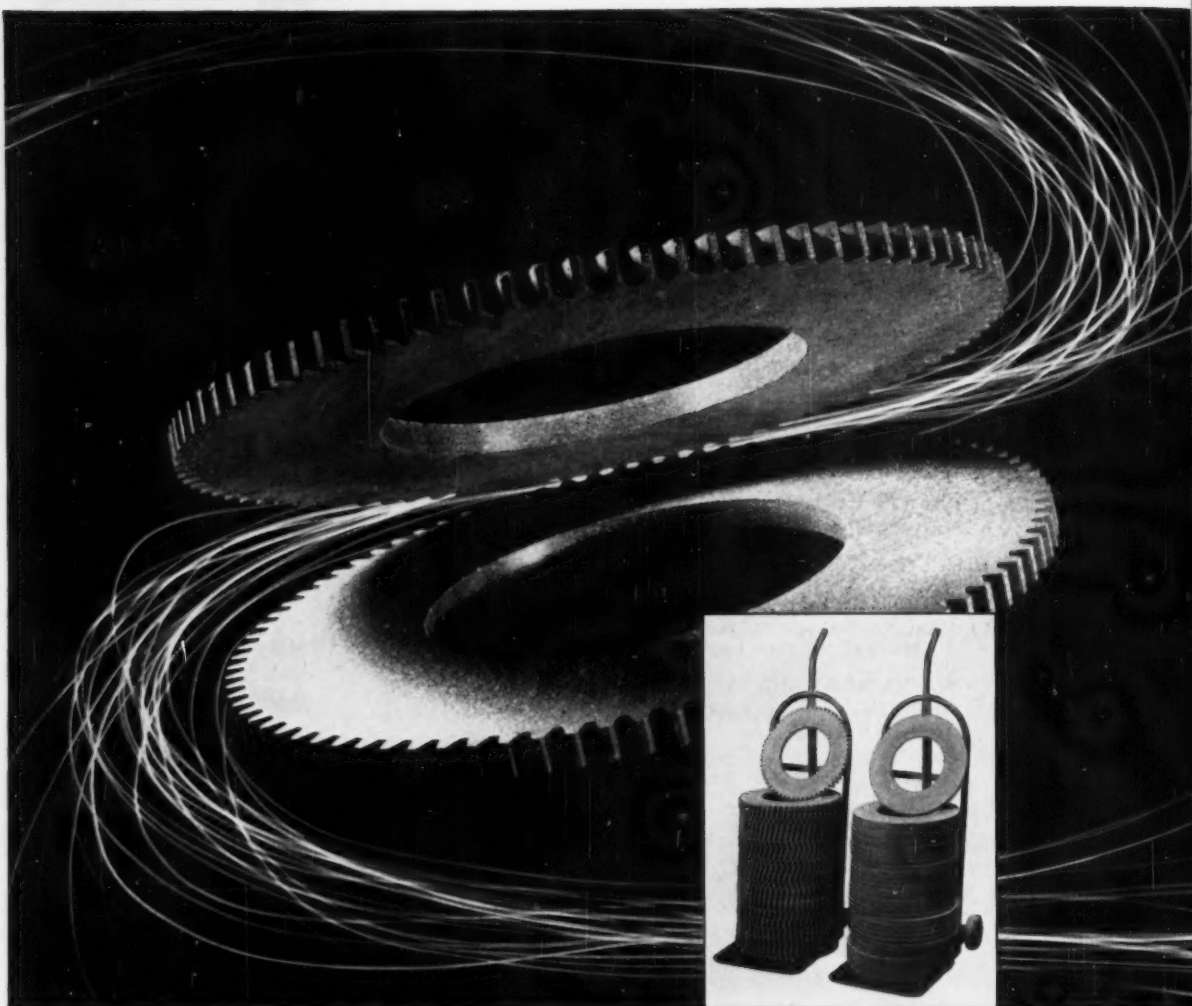
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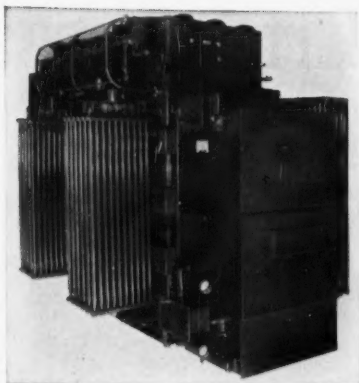
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OPINION

No Socony Polyethylene

TO THE EDITOR: We are pleased to note in your recent two-part report (*April 25, May 9*) that you share our views concerning the bright future for ethylene and its derived products. No better expression of our optimism can be had than the fact that we are proceeding, as mentioned in your article, with construction of a 380-million-lbs./year ethylene plant adjacent to our Magnolia Refinery at Beaumont, Tex.

There is one possible impression given in your article that we would like to clear up. By including Socony Mobil with other companies known to be carrying out pilot-plant or development studies on polyethylene, the inference is that we are doing likewise. Our current position is solely that of a merchant ethylene supplier to present or potential producers, and we are not intensively investigating or pilot-planting polyethylene processes with the aim of imminent entry into resin manufacture.

In general, we feel that your report is comprehensive, factual and well written. While there might be differences of opinion concerning such details as individual plant capacities, exact growth rates for derivatives, etc., we certainly concur with your over-all conclusion that ethylene and its derived products will continue to grow and occupy a position of major importance in the petrochemical industry. . . .

P. W. JUDAH
Manager, Petroleum Chemicals Dept.
Socony Mobil Oil Co., Inc.
New York

More on Poison Ivy

TO THE EDITOR: The article "Poison Ivy Tab Tops \$10 million/-Year" (*CW, June 27, p. 39*) is a most interesting and timely discussion of this market. . . .

Last year, Schering was the first American company to introduce the aerosol forms of the "predni" steroids for use in poison ivy and other allergic skin disorders. . . .

In addition, another form of poison ivy treatment not touched upon in the article is diphenyl methyl sulfate, which we have marketed for years under the tradename Prantal

VIEWPOINT

LITTLE KNOWN to the general public, but a source of amazement and frustration to many in industry, is the fact that there is a wide variance in the standards used by different government agencies in determining the content and purity of the various foods we eat.

The two agencies primarily involved here are the Food & Drug Administration and the U.S.D.A.'s Meat Inspection Division. FDA establishes standards for most processed foods and food ingredients; MID is responsible for grading meat and poultry, setting standards for processed meats.

Both have been in existence for 50 years. But through these years, policies have diverged. And today, sophisticated industry observers generally consider MID less stringent as far as purity standards are concerned, but much harder to convince that new food chemicals can perform a valid function. (Even today, MID shrinks from admitting that antioxidants exist. It suggests that such compounds be called "oxygen interceptors".)

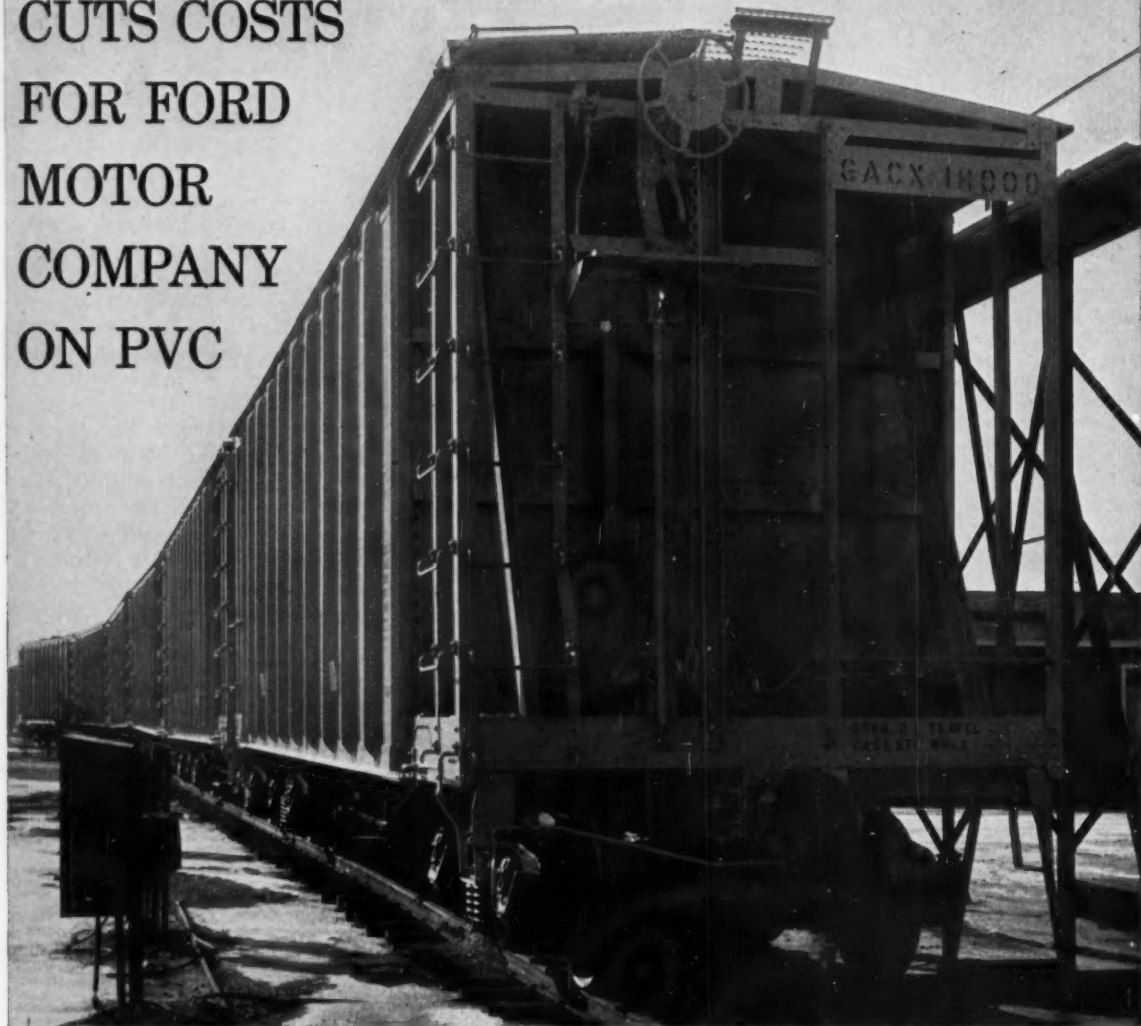
Our chief purpose here is to call attention to one curious, never-publicized development in the protection of the U.S. food supply. On March 10, MID, in its memorandum No. 270, said (with some qualifications) it would consider as "wholesome," and suitable for grading for commercial sale, meat from test animals that had been fed radioactive tracers.

Now, hold on there, MID. We hate to think of government laboratories and others not being able to sell test animals. But we'd agree with FDA that until testing shows that, as in the case of any other chemical, tracers are safe in the diet, they should be kept out.

This memorandum illustrates the differing standards of food protection that would seem to us a fine subject for Congressional investigation. And we wouldn't be sorry at all if it is resulted in MID becoming a part of FDA.

H. E. Johnson
Editor-in-Chief

BULK SHIPPING VIA AIRSLIDE® CARS CUTS COSTS FOR FORD MOTOR COMPANY ON PVC



Producing a better car for the least possible money is a constant challenge to auto manufacturers. To help solve this problem the Ford Motor Company is cutting costs of transporting PVC resin by bulk shipping in Airslide cars.

As a result, Ford not only gets substantial savings, but receives the PVC without in-transit contamination.

The Airslide car is filled by blowing the

resin through one of the top hatches of the car. At the unloading point, low pressure air is used to aerate the PVC and cause it to discharge by gravity. The product is then taken under vacuum through a pipe to storage bins.

If you ship or receive dry granular chemicals in bulk, investigate the advantages of shipping via Airslide car. You'll find it pays to plan with General American.

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Cream. Early in '58, this product was cleared for over-the-counter distribution.

HERMAN W. LEITZOW
Vice-President for Marketing
Schering Corp.
Bloomfield, N. J.

TO THE EDITOR: Your article on poison ivy remedies is a very good one, and quite comprehensive. However, no mention is made of one remedy that is based on silver. The silver in Agosan 258 combines with the hydroxy groups of the irritant urushiol and renders it inactive. . . .

LOUIS K. BRAUNSTON
General Sales Manager
Yardney Chemix Corp.
New York

TO THE EDITOR: [Re] your article on poison ivy remedies. . . .

Fatalities have been known to follow the use, prophylactically, of ivy extracts. In fact, many dermatologists, myself included, are opposed to desensitization therapy. It is safer to learn to recognize poison ivy, poison oak and poison sumac plants from the shape of the leaves and to avoid contact, than to attempt to desensitize by oral administration of extracts.

ERWIN P. ZEISLER, M.D.
Winnetka, Ill.

TVA Power Rate

TO THE EDITOR: In your Technology Newsletter (May 30, p. 69) you indicate that TVA's industrial rate is 6 mills/kilowatt hour. In fiscal year '58, the average rate for all industries supplied with TVA power in the Calvert City, Ky., area was 4.23 mills/kilowatt hour. The corresponding figure for the first 11 months of fiscal '59 was 4.01 mills/kilowatt hour. . . .

JAMES E. WATSON
Director of Power Utilization
Tennessee Valley Authority
Chattanooga, Tenn.

Add 'Marplan'

TO THE EDITOR: In your report (CW, July 4, p. 47) on the work done by Roche in the use of Marsilid analogs as psychic energizers, you name three compounds that were under test some time ago, but do not mention 1 - benzyl - 2 - (5 - methyl - 3 - isoxazolylcarbonyl)-hydrazine hydrochloride (Ro 5-0831), which is now being

marketed under the name of Marplan. It is more effective in lower doses than Marsilid, and the incidence of side actions is low. Marplan has been tested on over 4,000 patients. . . .

J. A. AESCHLIMANN
Vice-President—Research
Hoffmann-La Roche Inc.
Nutley, N. J.

Sour Gas Recovery

TO THE EDITOR: Your report on sulfur by Williams Haynes (May 16, p. 107) certainly covered a lot of ground and was very interesting. This article mentioned that British American Oil's Pincher Creek sulfur recovery plant, which came onstream in '56, was the oldest of such Canadian plants. We would like to point out that Shell Oil Co. of Canada's Jumping Pound, Alta., sulfur unit commenced production Feb. 21, '52, and was the first Canadian plant to produce sulfur from sour gas.

L. T. MUNN
Sales Manager
Chemical Division
Shell Oil Co. of Canada
Toronto

MEETINGS

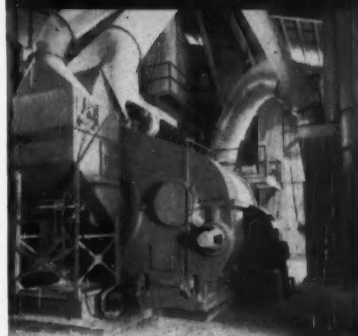
Gordon Research Conferences: At Colby Junior College, New London, N.H.—medicinal chemistry, Aug. 3-7; elastomers, Aug. 10-14; food and nutrition, Aug. 17-21; instrumentation, Aug. 24-28; cancer, Aug. 31-Sept. 4. At New Hampton School, New Hampton, N.H.—steroids and related natural products, Aug. 3-7; inorganic chemistry, Aug. 10-14; analytical chemistry, Aug. 17-21; statistics in chemistry and chemical engineering, Aug. 24-28; chemistry of adhesion, Aug. 31-Sept. 4. At Kimball Union Academy, Meriden, N.H.—biochemistry and agriculture, Aug. 3-7; toxicology and safety evaluations, Aug. 10-14; chemistry and physics of metals, Aug. 17-21; photonuclear reactions, Aug. 24-28; molten salts, Aug. 31-Sept. 4.

American Soybean Assn., 39th annual convention, Sheraton-Jefferson Hotel, St. Louis, Mo., Aug. 11-12.

Technical Assn. of the Pulp and Paper Industry, 10th testing conference, Multnomah Hotel, Portland, Ore., Aug. 17-21.

Chemical Institute of Canada, Physical Chemistry Subject Division; symposium on mass spectrometry in chemistry; McMaster University, Hamilton, Ont., Aug. 30-Sept. 1.

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An artistic illustration featuring several hands holding black rectangular blocks with white chemical symbols. The symbols include 'HC', 'CH', and 'N'. The hands are arranged in a circular pattern around the central text, with some hands holding multiple blocks. The background is a light, textured grey.

HC

HC

CH

HC

CH

N

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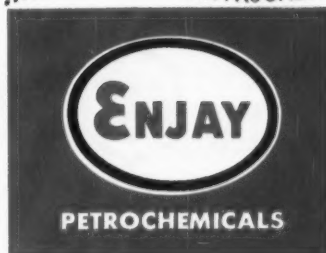
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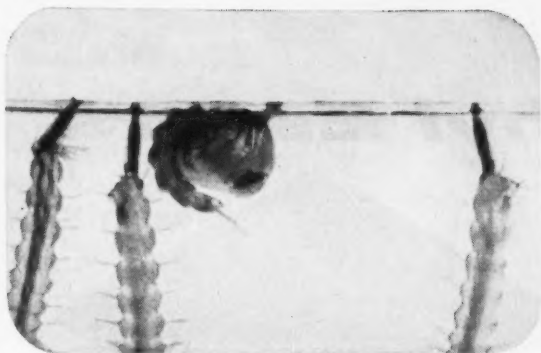
While new-comers to the field are constantly running into costly difficulties and delays with unreliable and even untried processes, Chemico designed plants are profitably producing an estimated 25% of the world's synthetic ammonia. Investors in the chemical industries may be interested to learn that despite the proven performance and countless advantages of Chemico's ammonia processes, it frequently costs less to build a Chemico Plant.

Write today for Chemico Bulletin #357 which lists the alternate feed stocks and methods for gas purification and production in the making of ammonia.

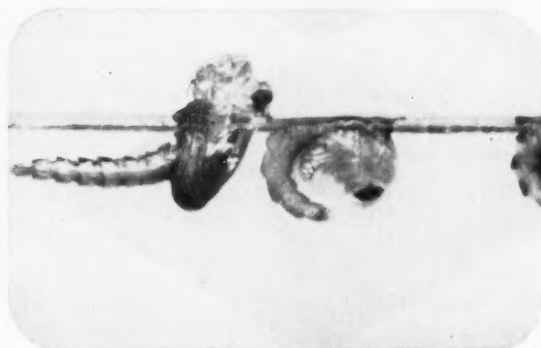


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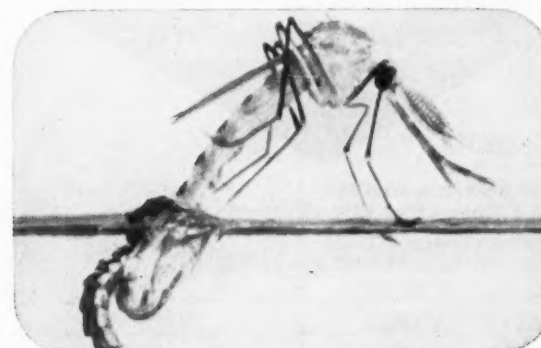
Larvae of Southern House Mosquito breathe through tube inserted at water surface. Pupal shell (center) holds adult just ready to emerge.



Skin is broken, and head of adult mosquito raises above water surface.



By pumping air into its abdomen, mosquito creates pressure to force itself out of pupal case.



Nearly emerged, and already hungry for human blood, adult mosquito (*Culex quinquefasciatus*) will rest briefly before it is able to fly in search of food.

TAKING OFF but headed for a fall

The dramatic photo sequence on the left illustrates the formidable powers nature has given to the insects that plague mankind. Science, however, has provided man with an arsenal of modern pesticides to protect his health and well-being.

Whether planning a community-wide mosquito control project, or preparing a more effective household insecticide formulation, two Hercules products can serve you better.

Thanite® (isobornyl thiocynoacetate) provides a quick knockdown of adult mosquitoes even when used at low concentrations. Low in cost, Thanite can be used in space sprays, aerosols, or fogging operations. It will not decompose under the heat generated by fogging machines, remaining effective at temperatures up to 1200°F.

Toxaphene, widely used as an agricultural insecticide, has recently been approved as a toxicant in aerosol space sprays, pressurized mothproofers, and nonpressurized space sprays. Toxaphene is economical and needs no auxiliary aromatic solvent. The long residual biological activity for which toxaphene is famous is winning new customers for household formulations.

Both toxaphene and Thanite are effective against many other household pests in addition to mosquitoes. Flies, fleas, bedbugs, ants, moths, and roaches are a few that are easy prey for these formulations.

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NX59-13



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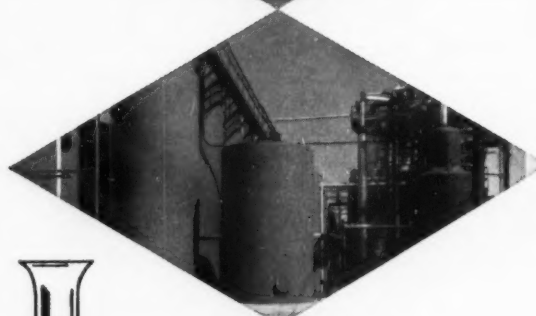
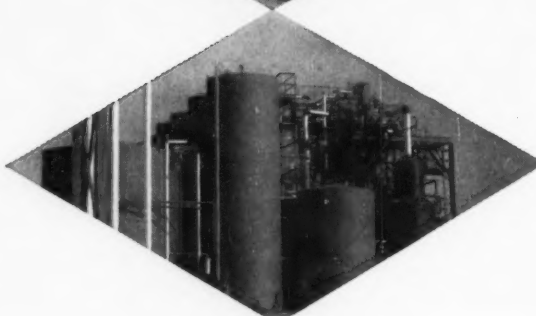
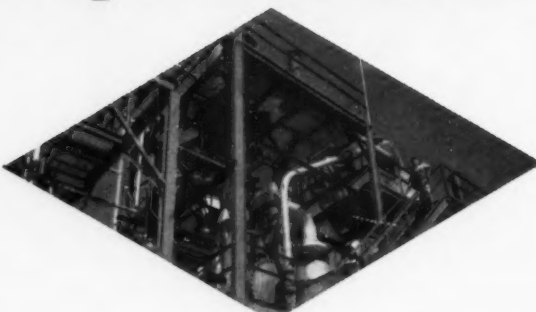
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We suggest you consider methyl esters wherever fatty acids are used. In most cases the methyl esters are more reactive and offer cost savings. Further, methyl esters are considerably less corrosive than the corresponding fatty acids. Many reactions involving methyl esters can be run in plain steel, eliminating the need for costly storage tanks and reactors.

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Business Newsletter

CHEMICAL WEEK

August 1, 1959

The West Coast's first vinyl acetate monomer plant is slated for construction. And a new polyvinyl chloride unit has been given the green light.

- American Chemical Corp., jointly owned by Richfield Oil and Stauffer Chemical, will go ahead on the PVC unit, last of four facilities that comprise its \$7.5-million program at Watson, Calif.

- Pacific Carbide and Alloys Co. (Portland, Ore.) plans to build a 5-10-million-lbs./year vinyl acetate monomer unit.

The success of this move rests on landing contracts from major West Coast consumers: Reichhold, Borden and Speciality Resins (Los Angeles). Current West Coast vinyl acetate monomer demand: 10 million lbs./year; by '62, 15 million lbs.

Other expansions of the week:

- American-St. Gobain Corp. has selected a site 14 miles from its Blue Ridge, Tenn., plant for its planned \$50-million plate-glass plant. The unit will have a capacity of 40 million sq. ft./year.

- Synthetic fiber producers will spend more than \$1 billion for expansion by '75—80% of it in the South and in Puerto Rico, according to a new MIT report.

•

New investment opportunities for U.S. companies will result from moves made in the capitals of Spain and Japan last week.

Spain is joining the economic mainstream by entering the Organization for European Economic Cooperation (OEEC), lowering tariffs, import quotas and customs taxes. This, together with such other belt-tightening moves as devaluating the peseta, is expected to lessen Spain's trade deficit and help curb inflation. The program will be backed by a \$425-million international loan package. Trade for the next year is expected to remain near current levels, but imports from the U.S. alone may eventually swell from \$300 million to \$800 million/year. Investment will be spurred by an antimonopoly law, and a liberalized investment law that will permit 100% foreign ownership, guarantee repayment of interest and full repatriation of profits. And there is already strong talk in Madrid about applying for entry into one of the European "Common Market" groups.

In Japan, restrictions on investment by foreigners will be eased by a new government policy liberalization announced last week. Under the '50 investment law, the government guaranteed profit or royalty remittances only if the government had enough foreign exchange. This has been used by protectionists as an excuse to block all but the most essential investments there by non-Japanese. Now, the government says, if the

Business Newsletter

(Continued)

investor is willing, it will approve deals on condition that remittances may be postponed if the exchange balance drops too low. Japan's foreign investment liberalization is being sparked by a favorable foreign exchange balance, a recently installed liberal cabinet, and pressure from Japanese producers eager for foreign ties.

Japan's chemical output during the first half of '59 was 30% above first-half of '58. This includes a 44% rise in petrochemicals and a 31% boost in tar products. Incidentally, Japan's first synthetic rubber plant has been formally opened. It's owned by Japanese Geon, in which B. F. Goodrich holds an interest.

•
Latest six-month earnings reports round out the picture of a record boom in the CPI (*see p. 21*).

- Profitability for chemical and metal companies is much improved. In the first half of this year, compared with the first half of '58, Metal & Thermit scored a more than 100% increase in earnings on a 24% rise in sales.

- But profitability for pharmaceutical companies is a different matter. Pfizer's net earnings actually declined, despite a nearly 15% boost in the first two quarters; this was due largely to "continued weaknesses in prices of penicillin, streptomycin, steroids and bulk vitamins." G. D. Searle reports that first-half sales rose 5.5% to \$17.2 million, but net income inched up less than one-half of 1%, to \$3.7 million.

- Profit margins also have slipped for producers of chemical raw materials. Texas Gulf Sulphur's first-half sales were up more than 25%, to \$33 million, but net income was up less than 1%, to \$7 million.

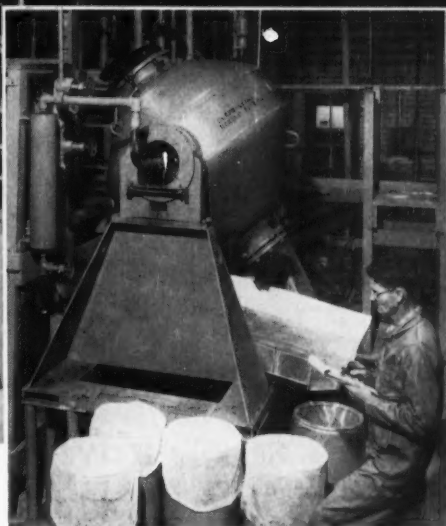
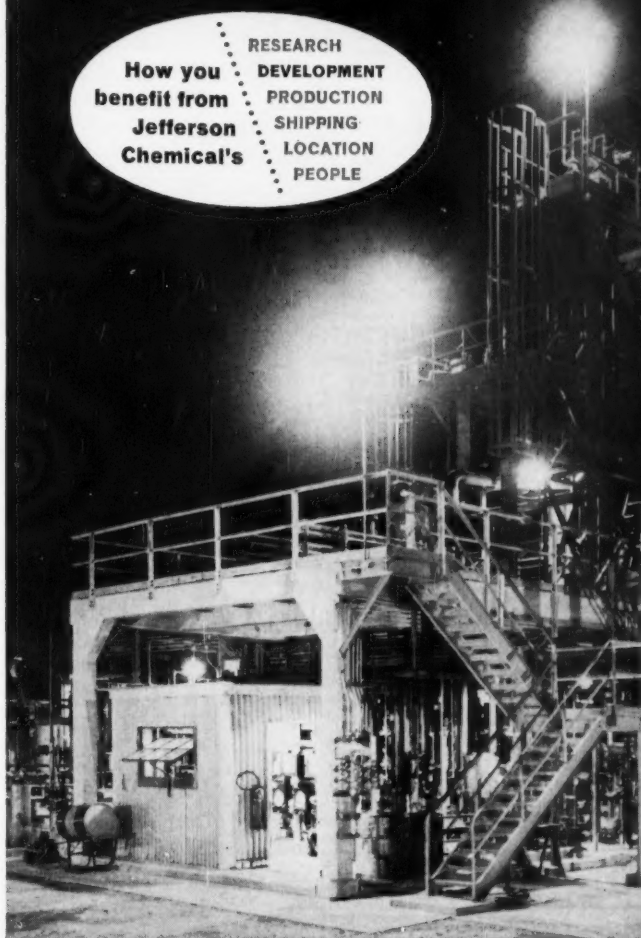
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Chemical producers are throwing support to dual rates for ocean shipping. This week, Dow Chemical Co., American Smelting & Refining and other major companies asserted in Washington that they want to continue using the special discount given to companies shipping ocean freight via organized steamship associations (conferences). Last year, the Supreme Court held that dual rates were illegal. But they were authorized, pending further study.

Lower, special-condition land freight rates may be one step nearer. The Interstate Commerce Commission for the first time has now approved "agreed" rates (lower costs for guaranteed annual railroad shipments) on volume coal shipments to Virginia power stations on three railroads.

•
"Fair traders" will have to wait another year, at least, for a national "fair trade" law. A Senate Commerce Subcommittee has shelved the bill, and voted to take no further action on "fair trade" this session. Supporters of the bill had hoped to push it through before Congress adjourns.

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Processing information, such as optimum operating conditions, corrosion characteristics, compositions of various process streams are obtained. These data, together with the equilibrium data obtained

in the laboratories, are frequently used in the design of improved or new plant equipment.

Producing special formulations to meet a customer's particular requirement is still another important phase of the development work at the Austin Laboratories. And thanks to an ably staffed and progressive research organization, Jefferson Chemical will continue to anticipate, and grow with, your chemical needs.



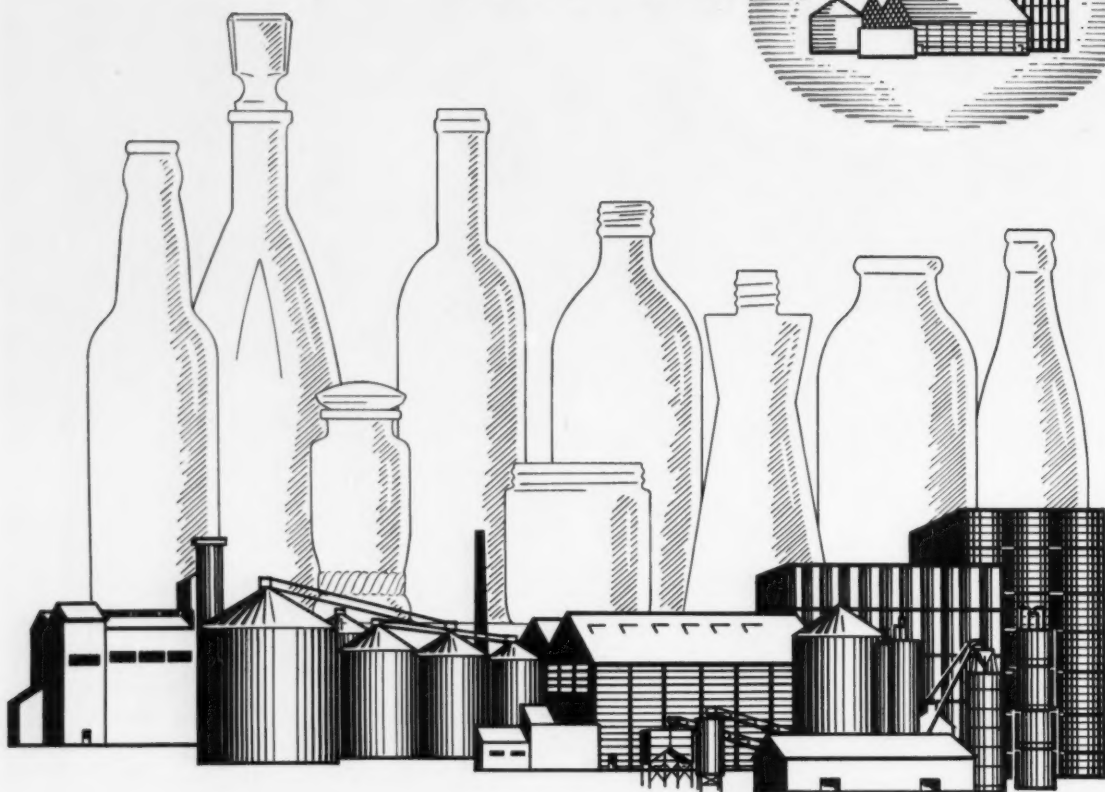
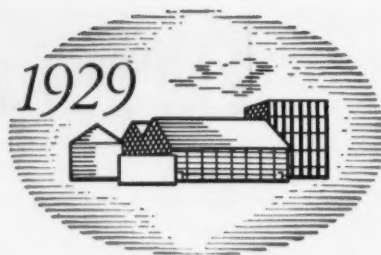
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August 1, 1959 • Chemical Week

19

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It takes two comparisons to get 1959's first-half sales and earnings figures—biggest in the industry's history—in proper perspective:

- First half of 1957, the prerecession peak.
- First half of '58, the recession's bottoming-out.

	SALES			EARNINGS			PROFIT MARGINS		
	Total for 1st half '59	Change from 1st half '57	Change from 1st half '58	Total for 1st half '59	Change from 1st half '57	Change from 1st half '58	1st half '59	1st half '57	1st half '58
Abbott Laboratories	58.4	13.6%	3.1%	5.6	9.3%	2.2%	9.6%	9.9%	10.1%
Air Reduction	101.8	9.4%	18.9%	7.8	-4.9%	19.2%	7.7%	8.8%	7.6%
Allied Chemical	372.5	6.6%	18.1%	27.9	26.5%	86.8%	7.5%	6.3%	4.7%
American Cyanamid	297.5	14.8%	15.6%	27.2	16.7%	41.3%	9.1%	9.0%	7.5%
American Potash	27.7	(2)	17.1%	2.5	(2)	15.4%	9.2%	(2)	9.3%
American Viscose	126.7	7.3%	31.5%	7.8	26.5%	1,714.4%	6.1%	5.2%	0.4%
Chemstrand	106.2	(2)	47.1%	14.8	(2)	132.6%	14.0%	(2)	8.8%
Colgate-Palmolive	292.2	14.6%	10.1%	11.1	34.9%	32.7%	3.8%	3.2%	3.1%
Diamond Alkali	65.9	5.7%	17.0%	5.2	11.1%	118.1%	7.9%	7.5%	4.2%
Du Pont	1,068.0	7.3%	25.3%	150.0 ⁽³⁾	9.9%	85.7%	14.0% ⁽³⁾	13.7%	9.5%
Foote Mineral	13.0	0.4%	11.7%	1.0	-13.0%	1.4%	8.1%	9.3%	8.9%
Freeport Sulphur	(Not Reported)			6.9	3.3%	15.8%			
General Aniline & Film	76.7	13.1%	13.3%	3.5	5.7%	91.7%	4.6%	3.3%	2.7%
Hercules Powder	137.2	10.0%	17.5%	11.5 ⁽⁴⁾	31.9%	49.8%	8.4% ⁽⁴⁾	7.0%	6.6%
Heyden Newport	27.8	10.9%	22.1%	1.4	-2.1%	91.0%	5.1%	5.7% ⁽¹⁾	3.2%
Hooker Chemical ⁽⁵⁾	74.7	18.2%	24.2%	6.9	25.8%	34.1%	9.2%	8.7%	8.5%
Koppers Co.	113.7	-25.1%	-14.8%	2.6	-63.2%	22.3%	2.3%	4.7%	1.6%
Lilly, Eli	94.1 ⁽⁴⁾	-6.4%	7.4%	11.6 ⁽⁴⁾	-34.6%	0.0%	12.3%	17.6%	13.2%
Lithium Corp.	5.7	-15.8%	4.0%	0.4	48.4%	8.3%	7.7%	4.4%	7.4%
Mallinckrodt Chemical	17.3	7.5%	5.3%	0.5	22.3%	45.1%	3.1%	2.7%	2.3%
Minerals & Chemicals	9.1	10.8%	20.9%	1.2	58.8%	180.8%	13.7%	9.5%	5.9%
Monsanto Chemical ⁽⁶⁾	413.7	13.6%	22.7%	33.8	20.5%	101.7%	8.2%	7.7%	5.0%
National Distillers & Chemical	270.3	2.0%	13.4%	11.8	0.8%	17.6%	4.4%	4.4%	4.2%
Nopco Chemical	17.9	24.5%	23.8%	1.1	36.2%	48.8%	6.0%	5.4%	5.0%
Olin Mathieson	347.3	19.3%	26.0%	17.5	-11.2%	78.6%	5.0%	6.8%	3.6%
Pan American Sulphur	10.5 ⁽⁴⁾	40.2%	37.9%	2.1	27.7%	34.2%	20.0% ⁽⁴⁾	21.9%	20.5%
Parke, Davis	90.8	19.6%	9.1%	13.7	23.8%	2.5%	15.1%	14.6%	16.1%
Pennsalt Chemical	45.3 ⁽⁴⁾	11.0%	17.7%	2.8 ⁽⁴⁾	40.0%	55.6%	6.2%	4.9%	4.7%
Pfizer, Chas.	122.9	24.8%	14.9%	11.4	13.4%	-1.6%	9.3%	10.2%	10.8%
Reichhold Chemicals ⁽¹⁾	47.4	43.5%	37.4%	1.2	10.5%	7.7%	2.5%	3.3%	3.2%
Rohm & Haas	109.4	20.4%	30.9%	11.8	42.7%	88.8%	10.8%	9.1%	7.5%
Stauffer Chemical	86.9	9.5%	9.1%	9.1	27.9%	31.7%	10.5%	9.0%	8.7%
Thiokol Chemical	80.7	214.5%	150.1%	2.9	242.1%	231.3%	3.6%	3.3%	2.7%
Union Carbide	760.1	10.1%	29.1%	90.4	29.9%	81.2%	11.9%	10.1%	8.5%
Victor Chemical	15.6	20.0%	18.7%	1.3	37.8%	60.3%	8.1%	7.1%	6.0%
Witco Chemical	24.9	26.0%	33.4%	1.0	55.1%	29.4%	4.0%	3.2%	4.1%
Wyandotte Chemicals	43.6	8.5%	24.2%	2.0	-9.7%	330.9%	4.6%	5.5%	1.3%

(Sales and earnings totals in million dollars.) (1) Excluding nonrecurring income, such as gain on sale of securities. (2) Comparable data for 1957 not reported. (3) Estimated net income on company's own operating activities. (4) Estimated. (5) For six-month periods ended May 31. (6) U.S., Canadian operations.

First-Half Boom: Biggest Yet for Chemicals

U.S. chemical companies—cruising along in high gear after breezing through the biggest three-month boom the industry has ever known—are brimming with confidence for the rest of this year. But they're well aware that the steel strike, coupled with other factors, might clamp a hard brake on the whole economy.

There's no question but that the second quarter was the industry's busiest period to date, with production of chemicals and allied products hitting an all-time peak—209 on the

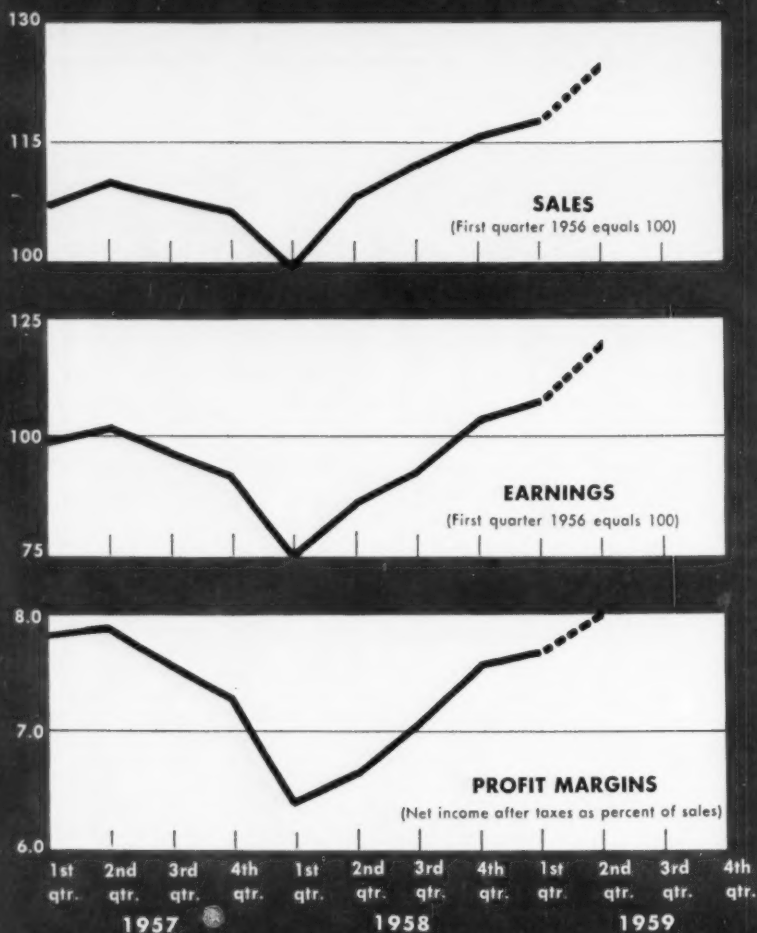
Federal Reserve's scale, based on the 1947-49 average as 100—and with chemical companies' sales and earnings soaring to new highs (*chart, p. 22*).

The third quarter has seen business continuing at or near those lusty levels, despite the shutdown of nearly 90% of the country's basic steel production capacity. And chemical executives generally are optimistic for both the third and fourth quarters, although they're quick to acknowledge that a long-drawn-out steel shutdown could crimp prospects considerably.

Proof of Confidence: One company that feels sure that business will remain brisk is National Distillers & Chemical. Its board of directors last week boosted the regular quarterly common-stock dividend from 25¢ to 30¢/share. Directors say they feel this move "is justified by the company's current earnings and its prospects for the future."

Allied Chemical—one of the many companies setting new sales and earnings records in the second quarter and the first half (*table, above*)—is expect-

CW Index of Sales and Earnings



ing a normal business decline this quarter. Reason: the seasonal drop in sales of nitrogen products and vacation shutdowns in customers' plants. President Glen Miller concedes that a protracted steel strike would accentuate that dip; but still holds that the outlook for the year is favorable.

Other companies take similar viewpoints. "Demand for our products continues strong," says a Victor Chemical spokesman, "and the outlook for the remainder of the year appears promising." Chairman and President Raymond Evans of Diamond Alkali sees cost-cutting as an added asset for '59 performance: "Present indications are that the increased demand for our products will continue through the remaining months of this year. This, coupled with the benefits derived from our cost-control program, should result in earnings continuing at a high rate."

Broad-based Optimism: Elsewhere

in the CPI, business for the immediate future appears to be on an equally sure footing. Ferro Corp. Chairman R. A. Weaver predicts that the second half of '59 "will produce excellent sales and profits, quite comparable to the last half of '58, but not so large as our record-breaking first half."

Libbey-Owens-Ford Glass Co.—whose first-half net earnings totaled more than five times as much as the year-ago figure—expects a seasonal third-quarter slowdown, but finds long-term trends encouraging. "Although construction is reported to be up 21% in the first six months, LOF sales of glass for buildings were approximately double the '58 volume."

And nonferrous metals producers are doing well. Aluminum Co. of America notched record first-half sales of \$424.9 million, although earnings were decidedly less than in first-half '57. Kennecott Copper more than doubled first-half earnings.

New Spurt in Paper

Confident of continuing market growth, six U. S. and Canadian pulp and paper producers this week are launching multimillion-dollar expansion projects from Quebec to Alabama to Puget Sound.

Bolstering their optimism: reports that 1959 production is running 13% higher than last year, and that the industry has achieved a notably closer supply-demand balance since mid-'58.

Here's how the newest expansions line up:

- St. Regis—a \$30 million expansion program at its Tacoma, Wash., facility.

- International Paper Co.—a \$13 million addition to its Pine Bluff, Ark., mill.

- Scott Paper Co.—a two-year, \$10-million expansion at Mobile, Ala.

- Menasha Wooden Ware Corp. (Menasha, Wis.)—a \$5-million neutral sulfite pulp and paper mill at North Bend, Ore.

- Canadian International Paper Co.—a \$10-million kraft mill at La Tuque, Que.

- Nekoosa-Edwards Paper Co.—new machinery in the Nekoosa mill as a major part of its \$15-million long-range expansion program.

Expanding East and West: St. Regis' latest expansion in Tacoma comes on the heels of its paper mill modernization and printing paper expansion in upper New York state (*CW*, July 11, p. 27). This newest move will bring into operation a 350-ton/day kraft paper and paper board machine. Included will be additional pulp manufacturing facilities and auxiliary equipment. The Tacoma mill now produces about 400 tons/day of kraft pulp and 230 tons/day of kraft paper.

International Paper's addition to its year-old facility in Arkansas will be a 50,000-tons/year machine to make lightweight papers and other groundwood printing grades. The expansion completion date has been set for January '61.

First step in Scott Paper's two-year expansion is the installation of a fifth paper-making machine. It will add 70,000 tons/year of specialty paper to the plant's capacity.

Captive Output for Containers: The Menasha mill is set for '61 operation. Bulk of the output will be used in Menasha's container box factory

at Anaheim, Calif. The 100-tons/day pulp and paper mill will use nearby fresh water supplies developed by Pacific Power & Light Co.

Main item in Canadian International Paper Co.'s 20-month expansion program at La Tuque will consist of installation of a fourdrinier machine for kraft paper and board, and laminating machine.

Expansion plans by Nekoosa-Edwards Paper Co. (Port Edwards, Wis.) call for installation of large new equipment that is expected to boost production as much as 20%. Nekoosa has 11 production units; this latest move is the biggest so far in the program, first launched in '57.

Meanwhile, indicating the increased attention of the paper industry to overseas operations, Crown Zellerbach Corp. has established a new subsidiary, Crown Zellerbach Corp., International.

R. O. Hunt, president of the parent company, said the subsidiary will act both to protect and strengthen existing markets in foreign countries.

Propylene for AviSun

Sun Oil Co. will produce propylene—largely for use by AviSun in making polypropylene—at Sun's Marcus Hook, Pa., refinery. The \$2-million unit, scheduled to go onstream by the end of the year, will turn out 120 million lbs./year of 99% propylene.

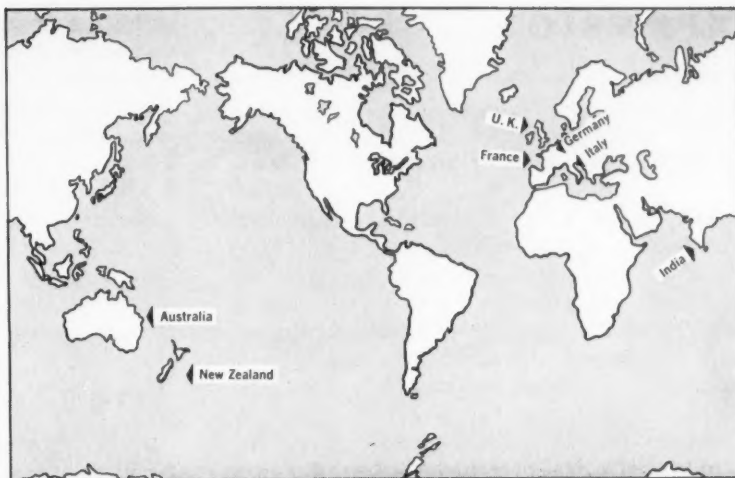
Sun Oil's latest move apparently underscores its optimistic view of the future for polypropylene plastics and other propylene derivatives.

Earlier this year, Sun Oil and American Viscose formed AviSun as a joint subsidiary for production of polypropylene (*CW*, Feb. 28, p. 20). It is now in startup operations for commercial production at a 20-million-lbs./year plant leased from Koppers Co. at Port Reading, N.J.

In a second project, AviSun is now installing equipment at New Castle, Del., to convert the resin to polypropylene film.

Also under way: a pilot plant for production of filament and staple fibers at New Castle.

Much of Sun Oil's new propylene output will be consumed by AviSun for these ventures. The Marcus Hook propylene facility is being fabricated by another Sun subsidiary, Sun Shipbuilding and Dry Dock Co.



Branching out abroad: Cyanamid's new \$13-million growth plan.

Cyanamid Steps Abroad

American Cyanamid—long a leader in overseas pharmaceutical operations through its Lederle Laboratories Division—is starting a multimillion-dollar, world-wide expansion program designed to make the company a significant factor in the overseas manufacture of specialty and agricultural chemicals.

This program, to be carried out by the Cyanamid International Division, calls for acquisition or construction by Cyanamid and its affiliates of nine manufacturing facilities in seven countries (*map, above*) for the production of pharmaceuticals, specialty chemicals and Formica laminated plastics. According to S. C. Moody, director general of Cyanamid International, about 50% of the \$13 million to be invested through the program by the end of '60 is earmarked for facilities for production of nondrug items.

Italian Subsidiary: Major among current developments is the plan to form a new manufacturing subsidiary in Italy, Cyanamid Italia S.p.A. The Italian subsidiary, with a total investment of \$4.8 million—70% by Cyanamid—is expected to go into operation Oct. 1, producing a wide range of pharmaceuticals. It will also add specialty chemicals and other products, Moody said.

Other manufacturing facilities planned under the new expansion program include a unit for the production of pharmaceuticals, including antibiot-

ics in Great Britain and an antibiotic fermentation plant in India. Facilities for the manufacture of Formica have been acquired in Germany, France, Italy and Australia, and new Formica manufacturing units are under construction in England and New Zealand.

Other Considerations: Also under "active" consideration, said Moody, is construction of new units for the manufacture of pharmaceuticals and specialty chemicals in Australia, Brazil, India, Japan, Mexico, Pakistan and Taiwan.

Moody forecast that, by '63, Cyanamid International will be producing at least 60% of all products it sells on the international market from manufacturing facilities located outside the U.S. and Canada. Presently the figure is about 40%, he said. Sales from international operations amounted to more than \$75 million in '58, are expected to top \$80 million this year.

Said Moody: "This expansion program reflects our confidence in the stability and long-range growth potential of world markets, and our conviction that growth lies in manufacture within local markets rather than by export from the U.S."

Moody also announced a realignment of Cyanamid International's management in which R. T. Bogan was named executive director, E. G. Hesse managing director, H. F. Bliss, Jr., assistant managing director.

EXPANSION

Photographic Film: Dynacolor Corp. (Rochester, N.Y.) is constructing its \$1-million plant and executive office on Mt. Read Blvd. Film processing operations will be continued at the Brockport, N.Y., plant.

Dibutyl Esters: Colton Chemical Co. (Cleveland, O.) is adding a "multimillion-pounds/year" esters plant to its Elkton, Md., installation. The plant will manufacture dibutyl maleate, dibutyl phthalate and similar products for emulsion systems. Increased storage facilities are also slated, with completion of the \$300,000 project set for late '59.

Petroleum Products: Shamrock Oil & Gas Corp. (Amarillo, Tex.) is adding an 8,000 bbls./day fresh feed catalytic cracking unit to its McKee refinery at Sunray, Tex. Construction, by Fluor Corp., Ltd., is to be completed next spring.

COMPANIES

Injection Molding Co. (Kansas City, Mo.)—maker of plastic bottles—is Rexall Drug and Chemical's latest acquisition in the plastics field.

Union Carbide's Linde Division is constructing a 500-tons/day oxygen plant at its Tonawanda, N.Y. works. It will be set up at the Ecorse, Mich., works of Great Lakes Steel, Division of National Steel Corp. Entire output will be used by Great Lakes Steel.

American Potash will exclusively develop and distribute Molybdenum Corp. of America's rare-earth products in the glass industry. Molybdenum Corp. will continue to mine and sell rare earths in the steel, metallurgical and other fields.

Tennessee Corp. directors have recommended a two-for-one common stock split, to be voted on by stockholders, Sept. 17. Par value would be reduced from \$2.50 to \$1.25.

Baltimore Paint and Chemical Corp. and **M. J. Merkin Paint Co.** (New York), have merged. Combined sales of the two companies will exceed \$16 million/year, with products sold from Maine to Florida through more than 2,200 distributors, dealers and jobbers.

Paragon Oil Co., Inc., has merged with Texaco, Inc. The marketing company and its affiliates on the East Coast will continue to operate as a separate entity under the same corporate names and management.

Allied Petro-Chemicals, Inc. (Overbrook Hills, Pa.)

is seeking registration of 100,000 shares of Class A common stock to be offered for public sale at \$4/share. Philadelphia Securities Co., Inc. also has acquired 30,000 shares of Class B common stock, convertible into a like number of Class A common shares.

Casco Chemical Corp. (Dallas, Tex.) has filed a registration statement offering for sale to the public 300,000 shares of common stock at \$1/share. Underwriters are Pearson, Murphy and Co. (New York). Casco does business in tallows, fats and vegetable oils. Its sales breakdown: 20% domestic, 80% abroad.

FOREIGN

PVC, Fertilizer/Iran: Iran's government-backed chemical development plans are being crimped by a lack of capital, the result of depressed world petroleum prices and the requirements of other sectors of the economy. The Iranian Plan Organization—government economic development agency—has reportedly held up work on the 9-million-lbs./year polyvinyl chloride plant which was to be built at Ahwaz by Montecatini for Development and Resources Corp. (New York). D and R laid out the area's development plan for the government. A fertilizer plant planned for the area has also been deferred, perhaps canceled. But Iran is seeking private capital to back these and other projects. The fertilizer plant will probably be built near Shiraz by two French firms. Backers for the PVC plant are still being sought.

Sulfur/Iraq: Texas Gulf Sulphur tells *CW* that rumors that TGS is negotiating with the Iraq Development Board to prospect and develop sulfur deposits are untrue.

Finance/Mexico: Private investment in Mexico is expected to surge as a result of last week's announcement that the government will cut required bank deposits from 25% to 15%, releasing a flood of credit.

Merger/England: Hess Products, Ltd. and the chemical division of Armour Chemical Industries Ltd. will be merged into a new company, Armour Hess Chemicals, Ltd. Half the shares will be owned by Armour, the rest by U.K. interests, including a substantial proportion by Associated Chemical Companies Ltd. Hess has held British patent rights on Armour's fractional distillation process for fatty acids, and has made the bulk of the industrial chemicals sold by Armour.

Amino Acid/Japan: Ajinomoto, a Japanese chemical producer, has licensed Dow Chemical Co. for production and sales in the U.S. and Canada of threonine, a synthetic alpha amino acid.

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CHEMICAL WEEK

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Washington Newsletter

CHEMICAL WEEK
August 1, 1959

Look for a showdown on U. S. tariff and trade policy within the Commerce Dept., now that Frederick Henry Mueller has been nominated as Secretary.

Once in office, Mueller will be as tough on East-West trade policy as was his predecessor, Lewis L. Strauss. Critics call Mueller an out-and-out protectionist. He not only fought for a tighter mandatory oil import quota program, but also favored granting heavy electrical equipment manufacturers protective quotas against foreign competition—but was overruled by the Office of Civil and Defense Mobilization.

This is not the type of trade policy endorsed by the White House. The position of Assistant Commerce Secy. Henry Kearns is more to White House liking. He has plumped for freer trade. Mueller and Kearns will try to avoid an open break. But it may come anyway.

•

Cuba's Fidel Castro wants U. S. investments. He is dickering with a group of Chicago investors to build a new fertilizer plant. At least, that is what Castro's Agrarian Reform Institute chief, Capt. Antonio Nunez-Jimenez said in Washington last week. Nunez said expropriation of U. S.-owned sugar cane fields in Cuba is still open to "negotiation," and that U. S. mills will not be affected in any event.

But he admitted that Cuba's new land reform law prohibits any foreigner from controlling any land for agricultural purposes. Industrial investment, according to Nunez, is something else again. He said he is negotiating with U. S. industrialists and investors "every day" during his visit here—both to settle questions of expropriation and to encourage new industrial development in Cuba.

Nunez said Cuba welcomes "any and all" industry. He specifically singled out the fertilizer plant project as having the "partnership" of his own Agrarian Reform Institute. But he said he hopes to negotiate other U. S. industrial projects on his visit here.

•

Barter of U. S. crops for foreign minerals is being both praised and damned in Washington. The Administration has asked for a straight one-year extension of the present agricultural surplus disposal law, P. L. 480. This includes a \$150-million barter program.

House Agriculture Committee Chairman Harold Cooley (D., N. C.) has proposed barter be boosted to \$350 million per year—though Agriculture Dept. witnesses, grain brokers and some farm groups are opposing this move.

The President's Foreign Aid Committee, headed by Gen. William Draper, on the other hand, came out for expanded P. L. 480 programs last week as part of its general recommendations on the U. S. foreign aid program.

Washington

Newsletter

(Continued)

Strong support for a bigger barter program came in testimony before the House Agriculture Committee by Manufacturing Chemists' Assn.'s James Towne. Towne said MCA favors the expanded program calling for \$350 million per year. But he urged one change—a provision to make domestically processed mineral products eligible for barter, provided they are processed from foreign ores.

This provision used to be a part of the barter regulations, but it was eliminated when the Agriculture Dept. tightened its barter rules two years ago. Chances it will be reinstated are highly unlikely, because the Administration is opposed.

Upshot: the Administration bill will likely be approved. Proponents and opponents of barter will cancel out each other's influence in Congress, and the Administration's proposals—to continue the barter program at present levels for another year—seem assured.

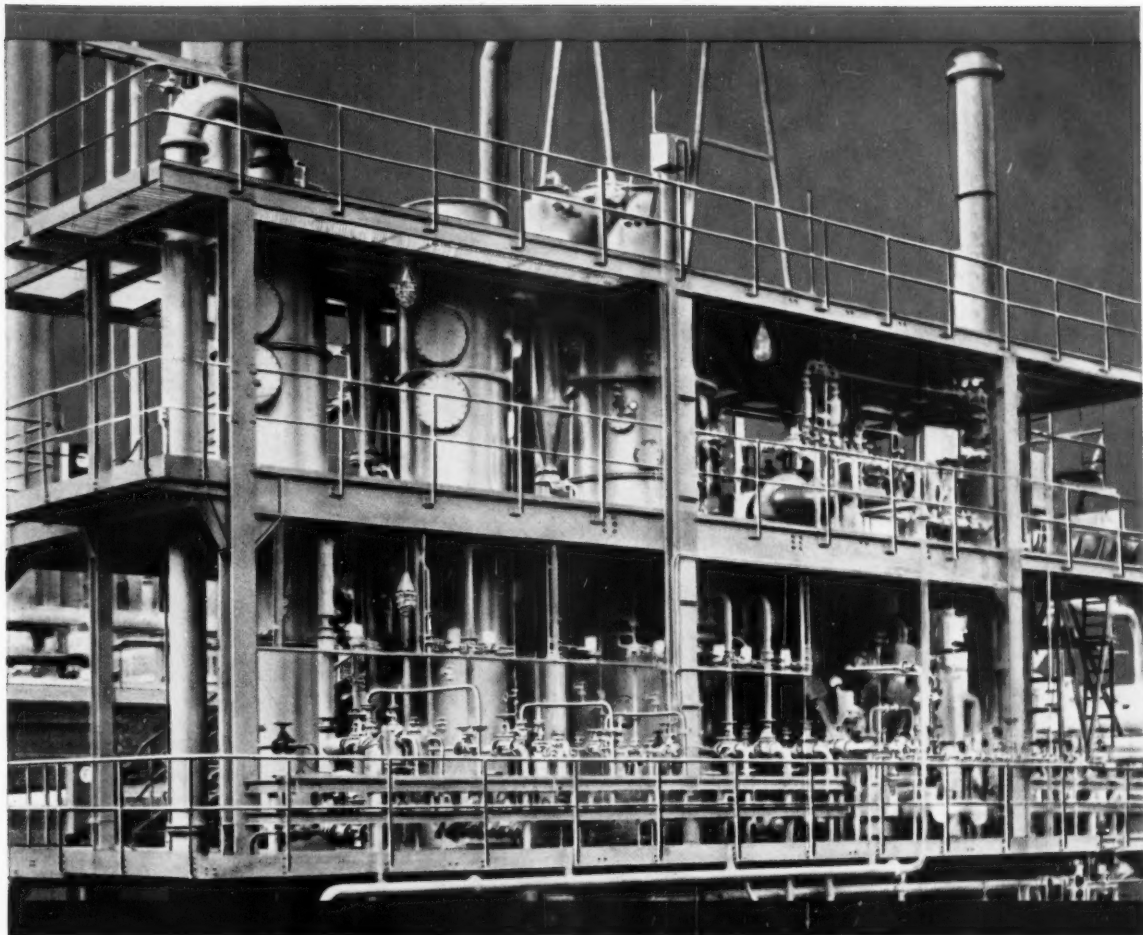
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A new list of 50 or 60 exempt food additives will be put out by the Food & Drug Administration in a week or so. It is the first supplement to the original list of 188 exemptions and consists largely of chemical substances rather than flavorings or seasonings.

•
The government's manganese purchase program is dead. The General Services Administration, the government's housekeeping agency, so declared last week in a letter to prospective sellers. GSA said the goal of 28 million short ton units for domestic incentive purchases of manganese under the so-called "carlot" program will be reached by Aug. 5.

Domestic producers, backed by Sen. James Murray (D., Mont.) are fighting the cancellation. Murray is asking for another \$23 million to allow GSA to buy an additional 10 million short tons in a program that would continue through June, 1961. Chances are about even Murray will win Senate approval of his plea for more funds.

•
Bills to limit state taxation of out-of-state companies are not likely to be passed during this session of Congress. The problems of drawing up a good bill are the big obstacle. Various interested groups each pushed their own particular approach in hearings before the Senate last week.

The general aim of all the proposals is to prevent a company from being taxed in a state if it merely solicits sales orders there and does not maintain a permanent office or establishment. The Supreme Court has refused to review cases involving two companies taxed by Louisiana on sales orders acquired in the state.



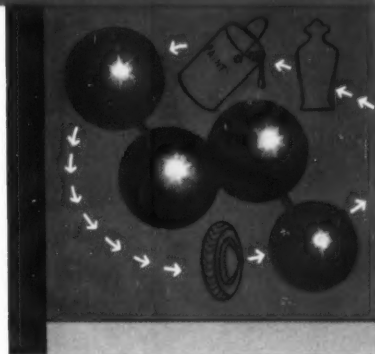
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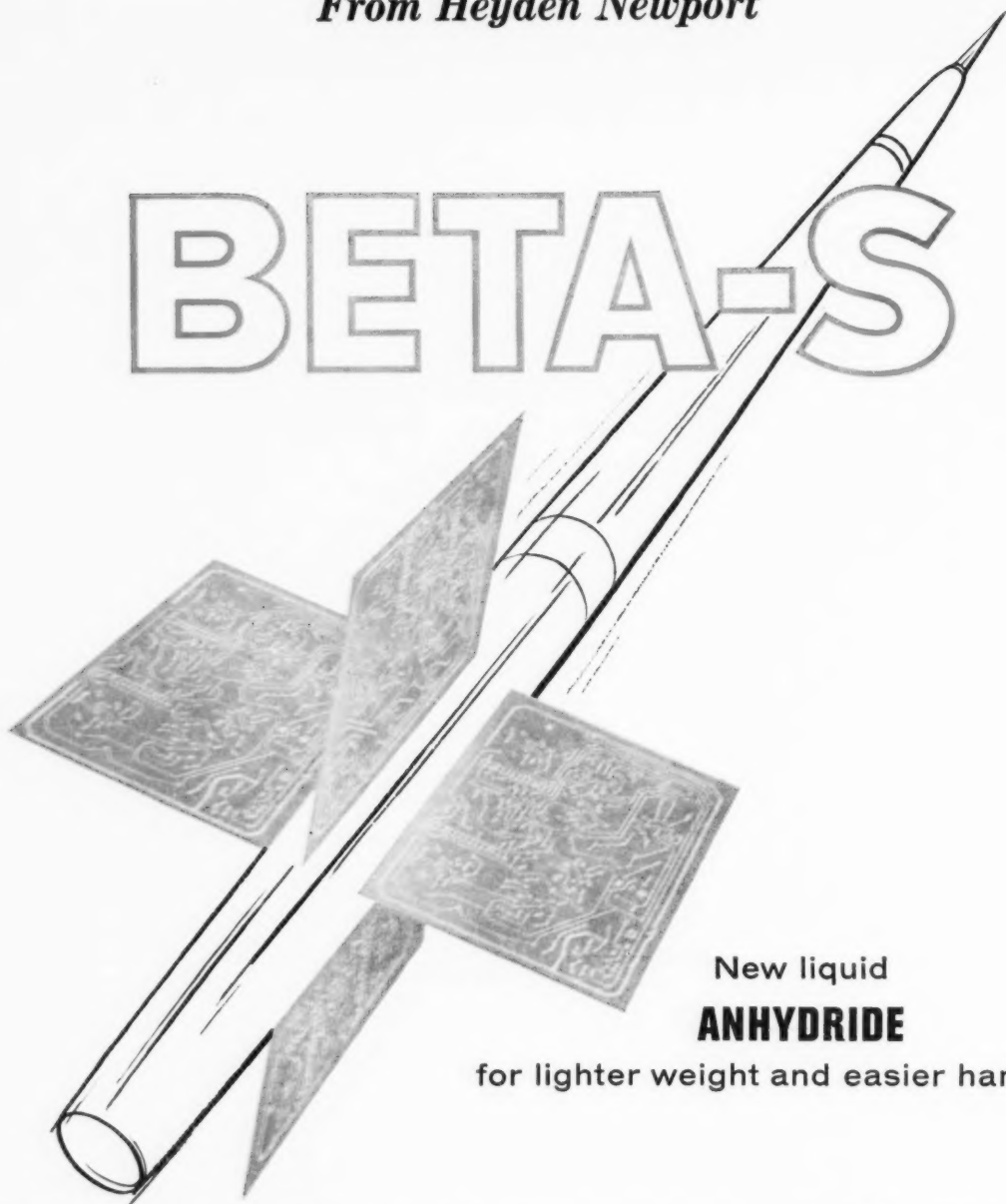
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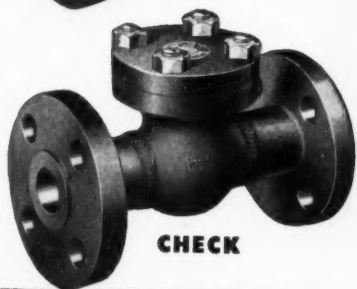
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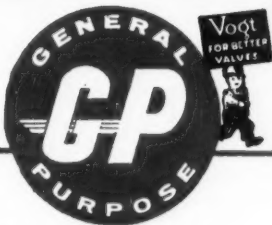
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PRODUCTION

New Tubing for the Bundles

The tubing pictured here, strapped and tagged for shipment, has one thing in common: all of it is welded carbon steel tubing for heat exchangers. And, this week, it appears to be gaining ground in its long, controversial struggle with seamless tubing for chemical process industries' heat-exchanger service.

For example, Babcock & Wilcox, using its newly coined Lectrosonic tradename, is pushing hard for wider acceptance of welded tubing. B&W's pitch: quality tubing that "in extensive field tests has proved equal or superior to seamless carbon steel heat-exchanger tubing" and which is 10-32% cheaper than seamless.

Meanwhile, the American Petroleum Institute is readying for the mails its first set of standards for heat-exchanger tubing. The standards make no distinction between welded and seamless tubing.

The road to equality has been a long, hard one for welded tubing. It has had to live down the "zipper tube" reputation it experienced during World War II because of poorly welded seams and improper heat treatment.

On the other hand, Republic Steel's Electrunite tubing has gained a strong pioneering reputation among tube purchasers. And U.S. Steel's National Tube Division is often mentioned as a welded-tube supplier.

Import Inroads: Improved fabricating and quality-control techniques by most welded-tube makers has helped the tubing gain stature. (B&W says its Lectrosonic line is the result of a five-year research program.) But welded-tube makers still have a hard fight on their hands, and it's not all a matter of proving welded tube's equality with seamless.

Foreign tubing imports loom as the biggest stumbling block. For example, one petrochemical company reports it can buy imported seamless tubing for about 40% less than domestic seamless. Domestic welded tubing cuts the price differential slightly; but foreign seamless still can be purchased for about 30% less than domestic welded tubing.

A heat-exchanger fabricator in the

Southwest says that only about 10-15% of the tubing it uses is welded, the rest seamless. And the cost of foreign tubing is a big factor. The Southwestern fabricator says that 15-20% of its tubing is foreign seamless.

Some domestic tube makers quietly argue the foreign tube price differential, point out that buyers can't be certain of foreign tube quality. There is some indication of a shying away from foreign welded tubing, but some companies report that much of the foreign seamless tubing meets ASTM specifications, is guaranteed by the manufacturer.

'Buy American': Some chemical companies won't buy foreign tubing, say they are worried about quality. Others consider foreign tubes only on equipment fabricated for foreign plants.

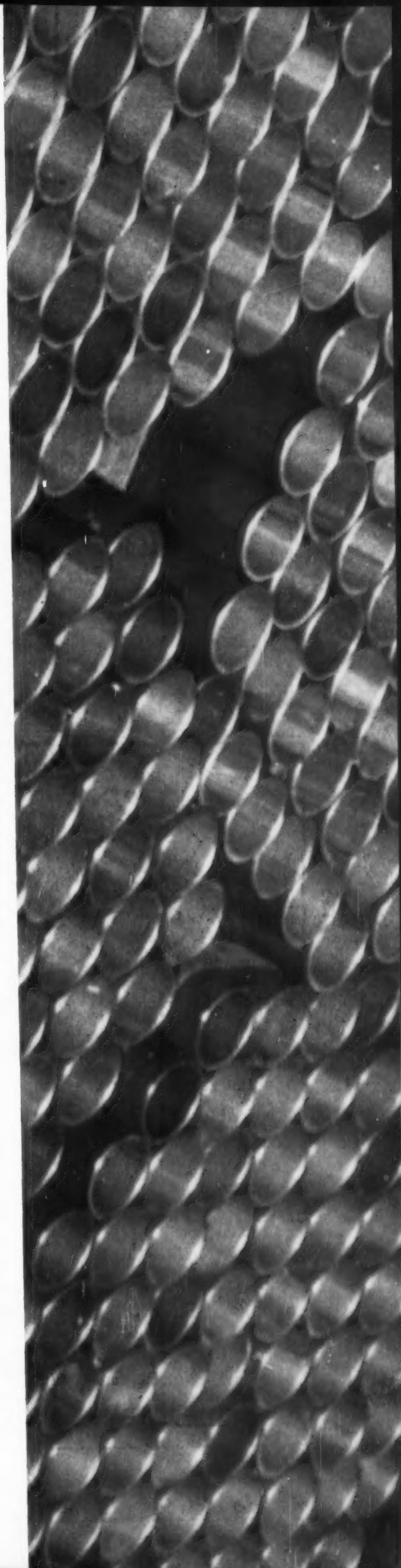
One definite drawback in buying foreign tubing is price fluctuation. For example, a fabricator points out that it takes four to six months to obtain foreign shipments. Price quotes are meaningless because fluctuations then may be as much as 20-40%.

Some companies say they'll continue to use domestic seamless tubing because the price differential isn't worth the added risks, particularly when the tubing must carry hazardous materials.

Several firms point out ways to save money by using seamless tubing. Because seamless tubes are extruded, variations in wall thickness are greater than with welded tubing. Some companies specify seamless tubing made to minimum wall thickness. But others buy less-expensive regular seamless tubing of the next larger size to overcome the plus and minus tolerances of regular seamless.

And, while some companies say that the biggest reason for using seamless tubing is the inertia of conservatism that was written into their specifications some years ago, others point out that there is no real argument — it's all a matter of service requirements. Welded carbon steel is satisfactory for many types of service. But in a good percentage of cases (one estimate: almost 40%), special-alloy tubing is needed.

Welded tubing is bundled for heat-exchanger use.





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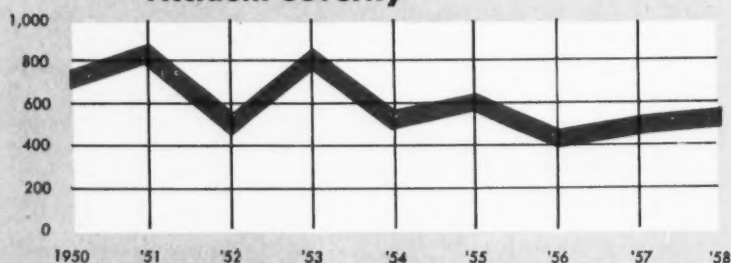
PRODUCTION

CPI Safety Record: Further

Accident Frequency*



Accident Severity**



Chemical Process Industries

	Accident Frequency*		Accident Severity**	
	1957	1958	1957	1958
Acids	5.25	4.29	244	663
Alcohol and wood distillates ..	6.69	7.38	173	357
Chlorine and alkali	3.96	4.33	668	695
Coal-tar products	3.60	4.65	875	1,048
Fats and oils	11.16	10.85	1,894	1,406
Fertilizers	8.27	9.76	777	1,572
Fuses and powder	1.92	2.30	369	129
High explosives	1.34	2.39	649	1,379
Industrial gases	7.36	7.61	414	736
Laboratories	2.13	1.40	90	73
Paint and varnish	3.73	4.11	270	216
Pharmaceuticals, fine chemicals, cosmetics	5.36	4.28	840	473
Photographic film	4.86	1.15	293	141
Plastic materials	1.61	2.13	383	474
Salt	9.47	13.74	315	2,514
Soap and glycerine	3.95	2.36	845	472
Synthetic fibers	2.24	1.32	355	265
Synthetic rubber	2.78	1.75	545	1,068
All chemical process industries	3.55	3.56	536	552

*Frequency rate is number of disabling injuries per 1 million man-hours of exposure.

**Severity rate is number of days lost per 1 million man-hours of exposure including charges for permanent disabilities and deaths.

Slip in '58

The chemical industry's safety performance continues to slide slowly away from the record mark it set in '56, according to National Safety Council figures now available for '58 (see charts and tables, left).

The accident-frequency rate of 3.56 (measured by the number of disabling injuries per million man-hours worked) changed little from the 3.55 rate of '57, stands as the third best (in '56, it hit a low 3.38) record since '23, first year of the NSC tabulations.

The '58 accident-severity rate, however, rose to 552, from 536 in '57. (Severity rate is measured by the number of days lost per million man-hours worked.) This was only fourth best in the chemical industry's NSC records.

The chemical industry's '58 mark bettered NSC's 40-industry average, standing eighth in frequency rate and 18th in severity rate. With the exception of the rubber and cement industries, it had a lower frequency of accidents than other industries usually included in the CPI. In severity rate, it was bettered by process industries such as rubber and glass.

Individual Standings: Of the 18 segments that make up NSC's chemical industry statistics, eight reduced their accident-frequency and severity rates.

Low-score standouts: Photographic film makers turned in the lowest frequency rate, were followed by four other classifications — synthetic fibers producers, laboratories, synthetic rubber and plastic materials makers.

Chemical laboratories had the lowest accident-severity rate, followed by fuse and powder makers.

Soap and glycerine producers showed the greatest reduction in accident-frequency rate—over 30%. Fuse and powder makers led in severity-rate improvement for the second straight year. Last year, it was a 65% gain; in '57 it was an improvement of more than 80%.

Rate fluctuation for most segments of the chemical industry was not as sharp as it has often been in the past. But the increasingly upward trend is an indication that the chemical industry must push harder to achieve a change of direction.



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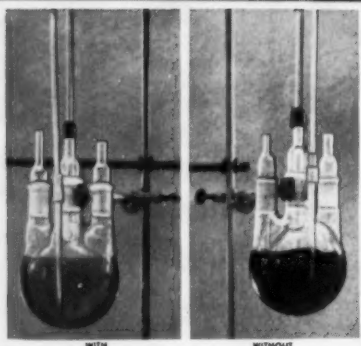
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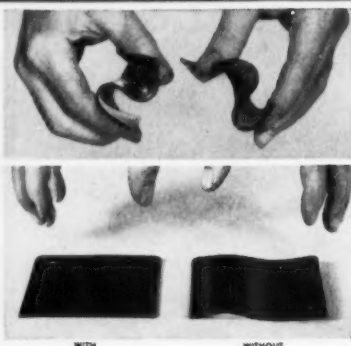
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Monsanto Task Force Chemicals...



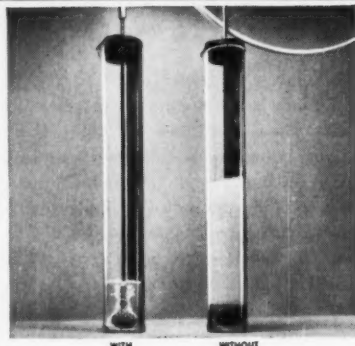
Toluenesulfonic Acid STRONG ACID CATALYST GIVES "CLEAN," EASILY CONTROLLED ESTERIFICATION REACTIONS WITH HIGH YIELDS

Organic reactions requiring a strong acid catalyst use TSA to produce higher yields with fewer side reactions. TSA virtually eliminates the charring and degradation products caused by oxidizing mineral acid catalysts such as sulfuric. Monsanto TSA has an exceptionally high purity and is the lightest in color of any produced commercially—has proved outstanding for making phenol formaldehyde and alkyd resins. It can also serve in the production of phthalate esters, epoxy resin varnishes, monoglycerides, polyvinyl acetate and similar esterifications. For example, nitrile esterifications (actually a two-step process involving alcoholysis) proceed more cleanly with higher yields and produce esters of better quality when catalyzed by TSA. Examples of the improved technique are reported in the *Journal of Organic Chemistry*, 23, 1225 (1958).



Elastopar CUTS PROCESSING TIME AND TEMPERATURE TO PUT SPRINGY LIFE INTO BUTYL RUBBER

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Defoamer PC-1344 CONTROLS IN-PROCESS FOAMING OF ORGANIC LIQUIDS AND INCREASES REACTOR CAPACITY

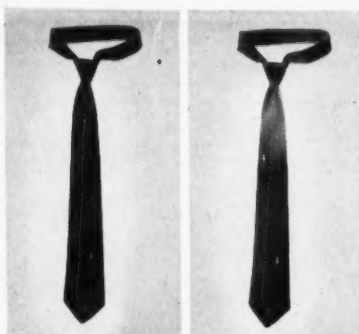
A non-metallic complex polymer, PC-1344 eliminates waste space allowed for foaming in the reactor—permits faster through-put and eliminates troubles in processing with many aliphatic or aromatic reactants. It tolerates up to 1.5% water, is increasingly efficient as acidity increases. Concentrations range from a few ppm to 0.50% depending on the process materials. In processing of wax, it eliminates the foaming, controls "bubbles" in wax coatings, promotes better leveling. Wax-coating machine speeds can be increased greatly. In alkyd processing, it controls foaming in the resin kettles and often helps reduce the cook time. PC-1344 is also used in various stages of refining, as an additive in petroleum products, and in the chlorination of hydrocarbons. Coatings manufacturers add a few ppm to the finished product to keep lacquers and varnishes from bubbling when sprayed or brushed.

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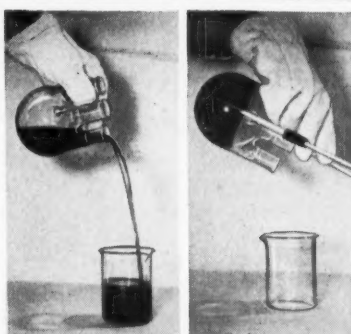
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Biphenyl

**SPEEDS UNIFORM DYEING OF
POLYESTER FIBERS, YARNS,
OR FABRICS**

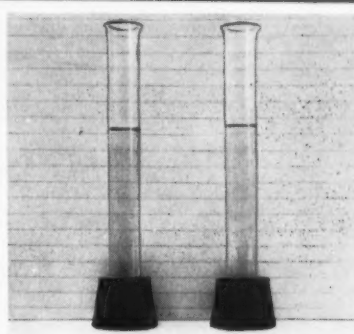
Hard-to-dye polyester fibers take deeper, more level coloring faster when biphenyl is used in the dye bath. The presence of biphenyl increases the diffusion rate of both disperse- and azoic-type dyes. The biphenyl apparently acts as a "carrier" or dyeing accelerator—deep shades and level dyeing can be achieved with dye bath temperatures in the range of 85° C, eliminating the need to run the dye bath in the range of 110°–130° C. Biphenyl appears to step up the rate of dye diffusion into the polyester fiber; the effect is to accelerate the rate of absorption. As little as 6% biphenyl on the dye weight in a 30:1 dye bath promotes this faster dyeing for deep shades and improved leveling. Currently used by a number of major dyers, biphenyl may also prove helpful in promoting the more uniform coloring of polyesters used for making fiber glass building panels and resin-faced concrete blocks.



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OF ALKYD AND POLYESTER RESINS**

A molecular chain "stopper," BENTHAL modifies the internal cross-linking of reactive dibasic acids and develops a degree of internal plasticizing in the products. In resin cooking, BENTHAL helps you reduce the acid value and complete esterification before excessively high viscosity develops and gelation occurs. As a laboratory example of the effect of BENTHAL: a 33% linseed oil-modified alkyd cooked at 430° F. reaches the gel stage in 49 minutes with an acid number (on the solids) of 60. With 10% of the dibasic acid replaced by BENTHAL, the resin does not gel for 75 minutes of cook time, shows an acid number of 30. BENTHAL serves to reduce the in-process viscosity of straight alkyds, oil-modified alkyds, and polyesters. It also improves their durability, alkali and water resistance, and gloss.



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GUARDS AGAINST DISCOLORATION,
CHELATES HAZE-FORMING CALCIUM,
LITHIUM, MANGANESE**

Triphenyl phosphite, in low concentrations (0.10%–0.30%), retards darkening during cooking of alkyds, unsaturated polyesters for glass laminates, saturated polyesters for urethane foams, or terminated polyesters for "permanent" type plasticizers. In combination with barium soaps and epoxidized compounds, it synergizes the combination to produce an excellent vinyl stabilizer system which, at levels of 0.5–1.0%, gives optimum heat and light stability. Triphenyl phosphite also acts as a metal-scavenger. In processes using calcium, lithium, or manganese catalysts, it chelates small amounts of haze-forming metal to keep the final product clear and cloud-free without filtering. Its newest most provocative use, predicted from established activity with high molecular weight alcohols, is to speed up simple esterifications of less complex, lower alcohols.

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Acting district managers don't take long to learn what keeps the boss busy—presentations, conferences

Prepping the Star Salesman for District

Do "star salesmen" make the best sales managers? This week, Monsanto Chemical's New York district of the Organic Chemicals Division is probing that question with a new tool—"trial by fire"—in addition to performance evaluations and psychological tests.

In the new program, a veteran salesman takes over the district sales manager's job for three weeks.

Last summer marked the firm's first experience with this new approach to selecting sales management material; this week a second veteran salesman in the division finishes his tour. Another will take the course soon.

Monsanto, like most other CPI firms, has grown enormously since World War II. Rapid promotions have created many vacancies among first-line management, especially in sales management. (Average length of stay as district sales manager: 3½ years). Thus, the company constantly faces the problem of selecting and training candidates for field sales manager positions.

The "trial-by-fire" approach is Monsanto's way of answering two questions:

(1) How well would this man func-

tion as sales manager if he were selected?

(2) Would he want the job if it were offered to him?

How It Works: Each summer, one or two of the veteran Organic Chemicals Division salesmen are selected to take the course. New York district management picks the men from among its nine salesmen, tries to give the opportunity to a senior salesman (10 or more years in the division). Although the Aug. '58 course lasted a month, this year's two candidates will each get three weeks' exposure to the boss's job. That's because the longer period causes too much work disruption.

The chosen salesman spends his first few days reading assignments prepared by district management. The content describes the nature and scope of the field sales manager's job. Simultaneously, he spends considerable time working side-by-side with the assistant district manager, learning how to handle various business problems. Also at his disposal is a district manager's handbook containing every form reviewed or processed, with instructions for proper use.

After preliminary preparations, the candidate is ready to tackle his first assignments. But before he does this he works out a daily schedule for himself. He's given a detailed checklist of the many facets of a sales manager's responsibilities. The scheduling problem, however, is his alone. This is done in the belief that planning a work schedule is one of the manager's prime responsibilities.

Busy Days: At this point, he becomes a sales manager in earnest. He checks each expense account submitted and approves all district expenditures (e.g., travel, utilities). He informs salesmen of all decisions from St. Louis or regional sales management. And he compares sales performance against territory analyses. During his tour of duty, the acting district manager visits and serves his key accounts as usual. But his other accounts are taken over by sales correspondents, or by sales trainees from the district office.

The acting DM, however, will often accompany the "inside men" on their calls, will counsel and instruct them in the proper handling of a sales call. Such "curbstone" conferences prove valuable to the young sales



and calls on customers.

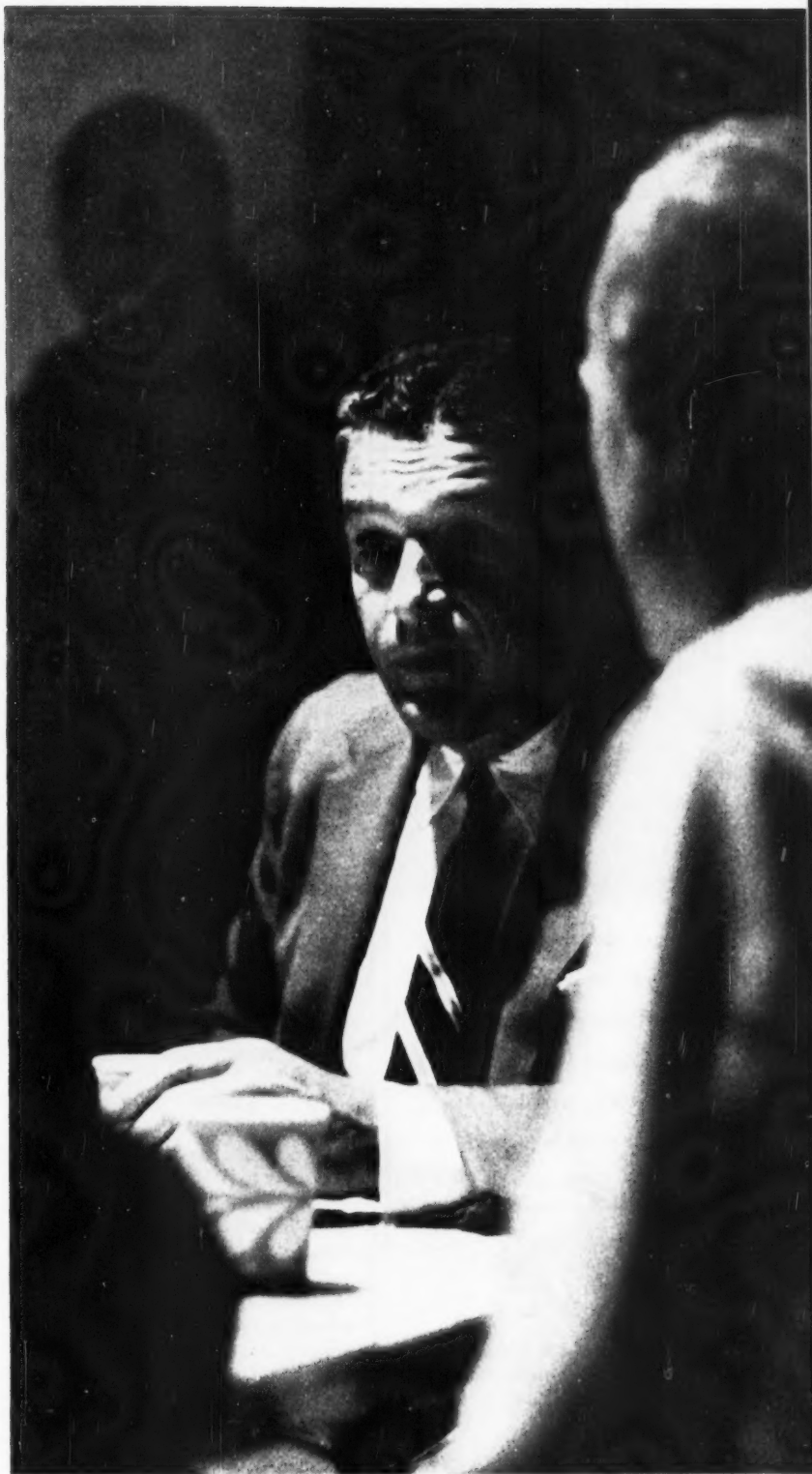
Management

trainees, also give the candidates useful manager experience.

Situations calling for independence have occurred in the course. As the time drew near to prepare a monthly report to division sales management, one acting manager, William Zeppenfeld, learned that some salesmen were tardy with their reports. Zeppenfeld's supervisors asked him coldly, "What are you going to do?" Zeppenfeld used his prerogatives as a salesmanager, got the data on time.

Monsanto reports, however, that independence must be tempered by management's hand where vital matters are at stake. On competitive pricing problems, for example, management listens to the candidate's judgment, but makes the final decision.

Performance evaluation of co-workers is another area in the course where independence is limited. The acting district manager evaluates work of only one sales correspondent but does not interview him. That's because personnel interviews should be performed by people with a continuing responsibility for the function. The single evaluation, sans interview, is done without the evaluatee's knowledge, gives Monsanto insight into the



Recent candidate, Fred Sturm, takes a break during a busy day.

CW PHOTOS—MARSHALL

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SALES

candidate's judgment on personnel matters.

Special Problems: Monsanto uses complex projects to teach candidates the scope and complexity of the district sales manager's function. Typical projects include preparation of annual sales budgets and forecasts, five-year manpower - requirement projections, planning and execution of quarterly sales meetings. Projects are especially valuable in revealing management potential because the "backward look" and the "forward plan" form a large part of the manager's task.

The projects usually are involved and complicated. For that reason, management often assists the candidate; the quarterly sales meeting, says Monsanto, is a "real undertaking even for an experienced man."

Setting up the course has required intricate planning, Monsanto reports. For one thing, the acting sales manager must be given authorization for financial dealings. And Monsanto people must be informed that he will function as acting district manager. Customers, as a rule, are not told about the change.

When the salesman who is acting as district manager ends his trial stint, he submits a detailed written report to management. He also reports on his experiences at one of the sales meetings for the benefit of other salesmen. The district manager, in turn, prepares a detailed report on the salesman's performance and submits a copy of it to the central personnel files.

Progress: The program is now sufficiently advanced to give Monsanto a good look at results. Ernie Robson, Eastern regional sales manager, who had a big hand in setting up the program, thinks this technique is valuable for finding and bringing along prime managerial talent.

Besides that, the program produces at least four secondary benefits:

(1) Salesmen get a good look at management, can compare job satisfaction in a selling capacity to that in the role of manager. This is of importance, as more companies now recognize that some of their top sellers would prefer not to make the switch to a management post.

(2) More of the sales force becomes management-oriented because of the experience. Decisions that formerly rankled the salesman might

fall upon more understanding ears after the field man has tried his hand at some of management's knottier problems.

(3) During emergencies or vacation periods, more salesmen will be prepared to take on the district manager's job.

(4) While a man is in from the field, sales correspondents and trainees ("inside men") gain valuable experience calling on customers. Added benefit: the advice and counsel of a seasoned veteran.

Robson, who only a few years ago, was catapulted overnight from salesman to district sales manager, felt that much more could be done in developing the first level of sales management. "It's that first rung, the firing line, where we need the most effort, if we are going to improve our selling organization," Robson told *CW*. To implement his convictions, he, together with several assistants, worked up the "trial by fire."

William Zeppenfeld, first of the New York district's veteran salesmen to take the course told *CW* that he learned far more than he had anticipated. "In the field," says Zeppenfeld, "you can't help but form some bias about the business. Taking over as acting sales manager certainly helped me see the big picture."

Moreover, Zeppenfeld said, he learned much about problems of office management and personnel handling. The big eye-opener: the damagingly high cost of phone calls and wires. Now he understands management's urging to consolidate calls.

Looking Ahead: Satisfaction with the training program ranges through the whole division. This year, the Boston and Wilmington districts are setting up similar programs.

And the idea has been extended now, to give more salesmen a somewhat similar opportunity. Monthly sales meetings are now planned and executed by field salesmen — with three months' notice and the assignments rotated among the men.

And just last May, the company instituted a corporate-wide school for district managers, John L. Gillis, vice-president for marketing.

As word of Monsanto's success with these training programs spreads, look for more CPI firms to try the practical approach to developing better sales managers.

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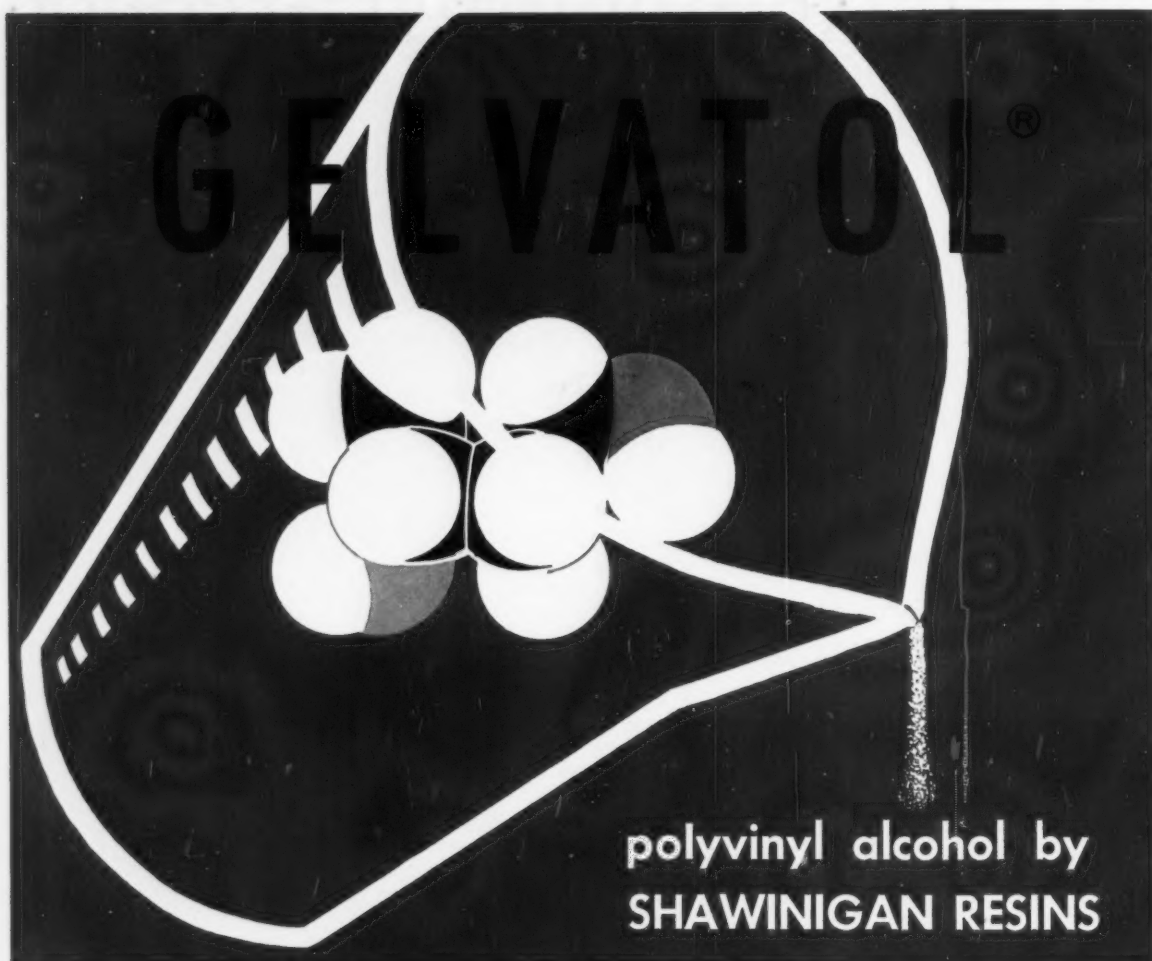


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3-60	23-28	2-4	99-97.9
20-60	21-25	19.5-24	89-86
1-30	4-6	0-3	100-98.5
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Technology

Newsletter

CHEMICAL WEEK

August 1, 1959

Fused uranium salts were proposed this week as a potentially better fuel for high-temperature reactors than the metallic uranium fuel elements now in use. Haakon Flood, Norwegian expert on molten-salt chemistry, who is currently at the University of California (Los Angeles), suggests that a continuously recycling mixture of uranium and other salts might solve such problems as radiation-induced distortion of metallic elements and the periodic replacement and reprocessing of solid fuels.

Main disadvantage of molten-salt fuels—and of such other liquid-fueled systems as the liquid-metal fuel reactor and aqueous-homogeneous reactor—is their severe corrosiveness, which puts serious limitations on materials of construction. To date, ceramic fuels based on damage-resistant uranium oxide and uranium carbide (*CW Technology Newsletter*, June 6) appear to be best fitted for high-temperature reactors.

•
Don't look for a "crash" nuclear airplane project. Pentagon scientists have decided that performance of such a plane would "not offer a substantial margin of improvement over chemically fueled aircraft." Construction of a prototype awaits progress in aircraft reactor development.

The decision is contrary to the opinion of AEC and Air Force proponents who want to put a prototype nuclear plane in the air as quickly as possible. Design project head, Maj. Gen. D. J. Keirn, argues, for instance, that the reactor shielding in current nuclear plane designs—a critical part of the project—"doesn't represent the weight of the chemical fuel" carried by a long-range bomber on a normal mission.

•
Prices of steam turbines for power generation are coming down. Allis-Chalmers last week joined General Electric and Westinghouse in reducing prices of large turbines. GE cited assembly-line production techniques; Westinghouse, "pre-engineered" basic-component-type manufacture, for the price cuts. GE also used the "pre-engineered" explanation for a price cut in small (500 to 4,000 hp.), single-valve multistage mechanical-drive turbines for petroleum and chemical use.

•
Rubies made by a new process that yields gems free from strain and resistant to thermal shock will be unveiled Aug. 9 at the retail jewelers' convention in New York. Carroll Chatham, San Francisco chemist, developed the method, says it is similar to the hydrothermal growth technique he uses in making emeralds (*CW*, June 11, '55, p. 51). It is believed the rubies are made at normal pressure. Rubies now made by flame-fusion are limited in commercial usefulness because of internal strains.

•
Latest company to let an outside firm exploit its unused patents is S. C. Johnson & Son, Inc. Johnson has agreed to give National Patent Development Corp. (New York) exclusive rights to arrange for buyers and licensees for about 30 patents and formulas.

Technology

Newsletter

(Continued)

Britain is switching its approach to thermonuclear fusion, last week disclosed plans for a new device—the intermediate current stability experiment (ICSE, pronounced “ice”)—to replace its present ZETA machine (*CW*, Feb. 1, '58, p. 20). The new device will cost an estimated \$1.1-1.4 million, is scheduled for completion in two or three years at a site near Harwell.

Main feature of ICSE will be a larger discharge tube. This will reduce the time required for discharging the extremely large plasma-producing pulses of electricity from a few milliseconds to a few microseconds. The new unit will be doughnut-shaped like ZETA and will employ the “pinch” effect, but will have a more complex magnetic system to improve stability and eliminate losses. The Atomic Energy Authority expects ZETA to be “good for another year’s useful experiments,” is planning to slow down—but not to abandon—current development of ZETA II, a larger improved version.

Other nuclear developments revealed by AEA last week: Britain’s first plutonium-fueled fast-breeder power reactor will start up next month; a steam-cooled, heavy-water reactor system is being considered for a 100-mw. experimental plant, possibly by the end of '62; commercial power plants based on the advanced gas-cooled prototype now under construction at Windscale are expected to achieve nuclear power production at “competitive” costs “between '65 and '70.”

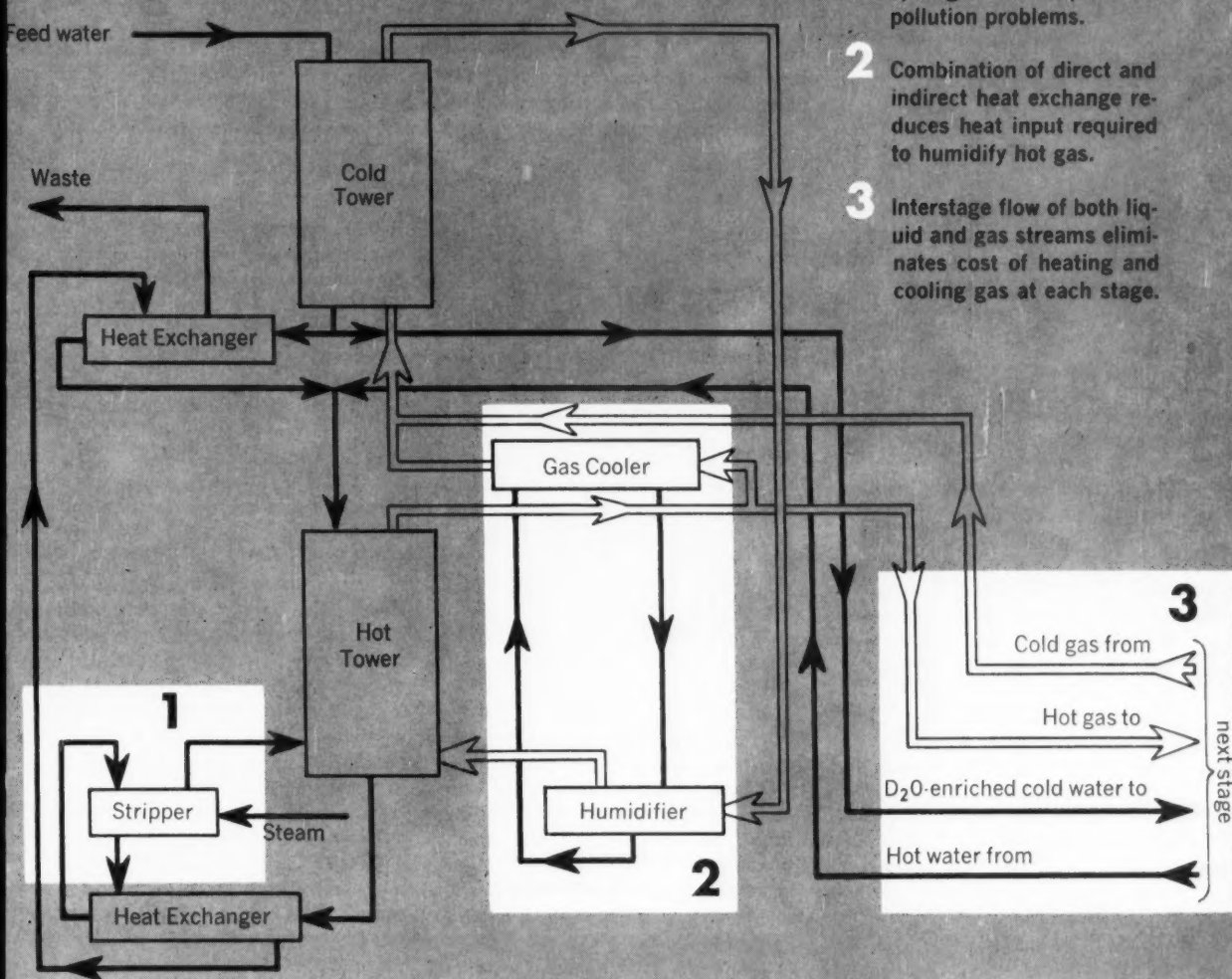
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Plans to expand the AFN high-energy-fuels plant at Henderson, Nev., are believed to be in the talking stage. The plant is owned jointly by American Potash & Chemical Corp., Food Machinery and Chemical Corp., and National Distillers & Chemical Corp. It went into operation last year to develop a large-scale production method for an alkyl borane fuel, under an Air Force contract (*CW*, June 28, '58, p. 78). AP&CC declined to comment on the status of the Henderson facility; but trade talk has it that the plant may be expanded to a feed rate of 1,000 lbs./hour, will go onstream by next year.

•
New chemical fuels which will provide 50% more thrust than such operational propellants as JP-4 and LOX were forecast last week by the Aerospace Industries Assn., a trade group for aircraft and missile builders. But that’s just the outlook for the next decade. Beyond 1970, AIA experts predict, nuclear or free-radical propulsion systems will replace chemical-reaction engines, may produce a fourfold increase in specific impulse over present rocket engines.

•
The antibiotic actidione will halt blister rust, a disease that threatens white pine stands, according to the U. S. Forest Service. In Montana tests, the chemical, sprayed or painted on the base of the trees, permeates the bark and enters the sap; it kills the rust in less than a year. Still another chemical, phytoactin, is now also under trial as a rust control. It may be sprayed from planes.

ENGINEERING

Three Keys to Heavy-Water Savings



- 1 Steam stripping of waste water recovers expensive hydrogen sulfide, prevents pollution problems.
- 2 Combination of direct and indirect heat exchange reduces heat input required to humidify hot gas.
- 3 Interstage flow of both liquid and gas streams eliminates cost of heating and cooling gas at each stage.

Heat-Saving Tricks Cut Heavy-Water Costs

The routine issuance last week of U.S. Patent 2,895,803 on inventor Jerome Spevack's isotope concentration system revealed heavy-water processing techniques that have been shrouded in secrecy and legal red tape for more than 10 years. Stripped of its highly technical terminology and wordy legal phrasing, the patent boils down to three key processing improvements (see flow diagram, above) that slashed heavy-water production costs from the prior method's \$110/lb. to the present \$13.50/lb.

Conserving heat: the basic principle of AEC's heavy-water concentration

process is a dual-temperature exchange of the deuterium isotope in a water-hydrogen sulfide system (*CW*, Oct. 5, '57, p. 31). Production units consist of several stages of concentration, each of which includes a cold tower, where the equilibrium favors deuterium enrichment of the water, and a hot tower, where the equilibrium is reversed to favor deuterium transfer to the hydrogen sulfide.

To provide a thousand-fold increase in deuterium concentration—from the naturally occurring 0.015% up to 15% in water—the production units handle tremendous volumes of liquid and gas,

both of which must be alternately heated and cooled. Therefore, maximum utilization of the thermal energy in the system is essential, Spevack points out, to the over-all operating economy. And heat conservation is the common denominator of all three process improvements.

Interstage Flow: The most radical departure from Spevack's original dual-temperature operation (U.S. Patent 2,787,526) was the introduction of interstage transfer of both process fluids. In the earlier version, only the liquid stream was carried forward through successive stages of concen-

tration, each of which had a separately recycled gas stream transferring deuterium from the hot tower to the cold tower. This was inefficient, says Spevack, because it required heating and cooling of the gas at each stage.

In the modified process, hydrogen sulfide is heated and cooled only in the first stage. Side streams off this main loop carry hot gas through successive hot towers, receive the cold gas returned through the cold towers. In effect, says Spevack, this arrangement provides two very long, conical towers (because of the concentration, each stage has only about one-fourth the throughput capacity of the preceding stage).

Though interstage flow of both gas and liquid streams is now "obviously the most simple arrangement," says Spevack, there were many skeptics who doubted its feasibility when it was first proposed. Even after pilot-plant tests had proved the operability of interstage gas flow, some engineers predicted that flow-control variations in a full-scale unit could cause a serious reduction—or even total loss—of heavy-water production. Fortunately, the system turned out to be relatively insensitive to flow-control fluctuations. And, more important, it provided the hoped-for savings, which account for about one-third of total cost reduction.

Combined Heat Transfer: An even-larger share of the savings—about one-third to one-half—are attributed to a novel combination of direct and indirect heat-transfer techniques used to heat the hydrogen sulfide gas in the first stage. In the older dual-temperature process, heat removed from the hot gas as it passed from the hot to the cold tower could be transferred to cold gas recycling from the cold to the hot section. But this heat exchange served only to raise the temperature of the gas, says Spevack; it didn't provide the much larger quantity of thermal energy (latent heat of vaporization) required to saturate the gas.

The improved process overcomes this difficulty by simultaneously heating and saturating the gas by direct heat exchange with hot water in a humidifier column. The water used in the humidifier is heated by indirect heat exchange with the hot gas as it flows from the hot to the cold tower.

Over-all effect of the direct heating and humidification, says Spevack, has been a substantial increase in heat

utilization. This not only reduced the quantity of unrecoverable heat that had to be disposed of, but also minimized equipment requirements. Other possible arrangements of direct and indirect heat exchange are covered in the patent, and Spevack has filed for additional patents covering other uses of these techniques.

Gas Recovery: The third process improvement, accounting for the balance of the savings on heavy-water production, was a new stripping unit that recovers essentially all of the hydrogen sulfide gas from the waste-water effluent. Gas recovery is important, says Spevack, because hydrogen sulfide is an expensive item and, if not removed from the effluent, would require additional treatment for pollution control.

Chief advantage of the recovery step: it operates at no cost. The key: the use of steam supplied to the system to make up heat losses. Waste water from the hot tower is heated and passed through the stripping column which is maintained at the same pressure as the rest of the system. A countercurrent flow of incoming steam removes the hydrogen sulfide, carries it back into the hot tower. As the stripped waste leaves the stripping column, it passes first through the heat exchanger used to preheat the unstripped stream, then through the heat exchanger used to heat liquid flowing from the cold to the hot tower. Waste effluent leaves the system at normal temperatures with a hydrogen sulfide content of less than 1 ppm.

Ahead? Spevack makes a projection that forecasts growth of "free-world" heavy-water demands from 450 tons/year in 1960 to 1,160 tons/year in '65. Taking into account the possibility of controlled nuclear fusion as a market for heavy water, his longer-range forecasts peg requirements at 8,000-11,500 tons/year by '75, as high as 54,000-110,000 tons/year by '85. AEC takes a slightly more pessimistic view, but concedes that Spevack's figures "could be in the ballpark." However, cautions AEC, these projections are based on an assumption that heavy-water power reactor concepts will prove sufficiently economic to make up some 30-40% of the growing power reactor business. And it will be several years, at best, before heavy-water reactors reach that point.

Present heavy-water requirements—including about 50-70 tons/year for

civilian markets and exports, plus 150-200 tons/year for classified uses—can be easily met by the Savannah River plant. And AEC's stockpile of heavy water is described as sufficiently large (exact size is classified) to ensure that unexpectedly high demands could be met until new plants are built.

Heavy water's chances of commercial success are slightly higher in foreign countries than in the U.S. Reason: it permits the use of natural uranium fuel in countries which can't afford to produce enriched uranium and which don't want to be dependent on U. S. supplies. France, for one, is considering producing its own heavy water; Japan foresees a future need for 350 tons/year, will probably make its own.

Domestic development of heavy-water reactor systems includes two AEC-supported cooperative projects—one in South Carolina, the other in Florida. But these plants require only about 20 tons of heavy water for initial loading—and low makeup is an economic necessity of such systems. Among the brighter prospects under investigation: the plutonium-recycle reactor now under construction at AEC's Hanford, Wash., plant which would require 100-200 tons of heavy water for a full-scale 200-300 megawatt installation; the aqueous-homogeneous reactor being developed at Oak Ridge, which employs a slurry of fuel suspended in a heavy-water coolant-moderator.

Competitive Commodity: When and if the commercial market for heavy water opens up, private producers stand a good chance of getting into the picture. Spevack has frequently described AEC's production cost of \$13.50/lb. (exclusive of plant amortization) as a "realistic figure," predicts that a private company could produce heavy water and make a profit at the current AEC selling price of \$28/lb. (Free-market rates as high as \$87/lb. have been mentioned in foreign heavy-water operations.) Spevack is presently seeking to exploit the process commercially, has plans for a \$10-million plant to produce heavy water for "free-world" markets.

For its part, AEC would be happy to get out of the heavy-water business. The commission is hopeful that commercial producers will be ready to fill the gap when demands exceed the 450-tons/year capacity at Savannah River, says "they will be welcomed with open arms."

BRIEFS

- on a new form of benzoic acid
- a strategic way to buy alkalies
- finding a "new" intermediate

Crystallized benzoic acid is sneezeless—flows and dissolves faster

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Ever spend weeks trying to develop a new intermediate for a project, only to find it has been around all the time?

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RESEARCH



CW PHOTO—AL WAGG

Atlantic Research's Rumbel readies test of new solid propellant—cast or extruded from a plastisol.

Starting a New Propellant Production Plan

The screen of silence in the solid-propellant field was pierced with Pentagon blessings last week by Atlantic Research Corp. It revealed details of a new solid propellant, as well as a relatively simple method of producing it on a continuous-flow basis.

Keith Rumbel, vice-president in charge of research operations for ARC, told *CW*, "The technique involves the use of a well-known industrial plastisol system. We've adapted it to the propellant field."

Production Line: To make the solid propellant, Atlantic researchers first prepare a plastisol slurry consisting of a plasticizer oil in which spheres of plastic (one micron in diameter) and a propellant oxidizer are suspended. The slurry is solidified by 350 F heat. At this temperature, the plasticizer oil fuses with the plastic, forming a uniform mass in which the oxidizer is imbedded. The propellant, once cooled, can be trimmed, placed in a

rocket shell and fired by pyrotechnic methods.

Shelf life is excellent, according to Rumbel, "probably in the several-year range." During storage, the oxidizer, in close proximity to the fuel, slowly reacts, depleting the fuel in the "grain" (propellant terminology for charge).

The fuel, binder and oxidizer can be varied to meet the requirements of the propellant, say ARC spokesmen. For instance, a practical gas-generator formulation burning in the neighborhood of 2000 F, and used to run a turbine, includes an ammonium nitrate oxidizer and a nitrocellulose-nitroglycerine fuel-binder. Higher burning temperature systems (e.g., 5600 F range) are prepared using a polyvinyl chloride-ammonium perchlorate formula, adding high-energy ingredients such as metallic aluminum.

Ease of Processing: Atlantic researchers are presently using a batch-

casting method in which the raw plastisol mix is placed in a mold and steam-heated to the required fusion temperature. But they are in the final stages of adapting production to a continuous screw-extrusion method, where the components are mixed and heated by the action of the screw, remain in the press only three minutes and are extruded in any desired shape as a finished propellant.

The extrusion method would reduce the cost of the propellant to approximately 37¢/lb., compared with 65¢/lb. for the casting method (for a 7-lb. grain). Note: casting propellant in larger-sized grains cuts cost; for instance, a 100-lb. grain costs 49¢/lb.; a 700-lb. grain, 43¢/lb.—this cost differential, however, would be eliminated by employing a continuous extrusion process.

Although developed specifically for military uses, future civilian uses for plastisol propellants are not far off.

Keeping Insects Off

Latest way to protect textiles from attack by insects: fend them off with a family of compounds known as antimetabolites. These are colorless, odorless and harmless (to humans) compounds, differing only slightly in chemical structure from vitamins—but different enough to cause havoc to an insect's metabolic chain.

The most-efficient, least-expensive compounds in the family are picolinic acid, 3-acetyl pyridine, sulfanilamide. These take effect against larvae by upsetting their digestive system, causing embryonic starvation. Full-grown insects, however, recognize the difference between the compounds and real vitamin-bearing materials, won't eat the antimetabolites, make no attempt to approach fabrics treated with them.

All three compounds may be added to finished textiles or applied to new fabrics in the dyeing process. Roy Pence, an entomologist at the University of California and developer of the process, says the several million dollars worth of damage caused annually by insects to carpets, upholstery and clothes may be eliminated by using his discovery.

PRODUCTS

Tracer Compounds: Four new C^{14} tracers are available from Tracerlab, Inc.'s Radiochemical Dept. (Waltham, Mass.). Included: adenine-8- C^{14} sulphate; guanine-8- C^{14} sulphate; 1-methionine-methyl- C^{14} ; and, 1-ethionine-ethyl- C^{14} . Suggested uses: biomedical research.

Tracerlab, Inc. is also offering a stock of radioactive clathrates. They're a crystalline form of hydroquinone and gaseous krypton-85. The krypton is not chemically bound but is mechanically trapped in the crystal, may be considered a solid form of krypton-85. Krypton-85 is a beta emitter, with a half life of 10.3 years.

Garnet Crystals: Gadolinium iron garnet crystals, as well as other rare-earth garnets, are available from Semi-Elements, Inc. (Saxonberg, Pa.). Advantages claimed for the garnets, (usable in the microwave and electronics field) over conventional ferrites are: low loss in transmission of short-wave energy, low activation power re-

quirements, high reproducibility in resolution of transmitted energy.

Light Stabilizer: Ferro Corp.'s (Cleveland) latest entry is a polyethylene light stabilizer, Ferro AM 101. It reportedly extends the useful life of sunlight-exposed polyethylene from two to five times. Cost will be approximately one-half that of conventional ultraviolet light absorbers.

Steroid Base: Chemed, Inc.'s (White Plains, N.Y.) latest entry is a steroid raw material called saponin. Saponin contains genin and smilagenin as its steroidal components. Smilagenin may be converted to "compound S" and "delta-1-S" (useful in anti-inflammatory drugs) or to progesterone. It can also be changed to 4-androsten-3, 17-dione, used to prepare androgenic and estrogenic hormones.

Silane-Modified Resin: Monsanto Chemical Co.'s plastic division is out with a silane-modified phenol-formaldehyde resin which reportedly retains its strength after hundreds of hours at 600 F. It's called Resinox-SC-1013.

Fatty Nitrogens: Twenty-four new fatty nitrogen compounds have been made available by General Mills' Chemical Division (Minneapolis). Among them: four primary, five secondary and three tertiary fatty amines; four fatty trimethyl ammonium chlorides, five difatty dimethyl ammonium chlorides, one trifatty methyl ammonium chloride, and two quaternized fatty diamines.

EXPANSION

• Libbey-Owens-Ford Glass Co. (Toledo) has opened its new \$1.3-million engineering building, will complete expansion of research facilities this month.

• Armour Research Foundation (Chicago) has broken ground for its \$3.5-million research center in that city. Expected date of completion: mid-'61.

• Carborundum Co. (Niagara Falls, N.Y.) has created a technical branch in its Coated Abrasives Division. This is in line with recent company policy to decentralize research and development activities, placing them directly in the company's various operating divisions.



Measuring temperature in Avco's . . .

New Heat Source

High-temperature laboratory heat sources have pushed through the 12,000 F mark this week with the introduction of Avco Corp.'s (Wilmington, Mass.) new jet plasma generator (above).

Avco spokesmen told CW the unit, which weighs only 3½ lbs., will sell for approximately \$4,000 (with the generator power unit).

The jet plasma generator creates high temperatures by passing gases (e.g., air, argon, nitrogen, helium) through an arc created by tungsten cathode and copper anode. The gases are injected into the arc chamber where they flow through an area occupied by the arc discharge, become part of the discharge and form the plasma (a pocket of ionized gas). The equipment is water cooled, reportedly is safe to use without barrier walls, as the arc is well controlled.

As shown in the photo, temperature measurements were made by placing a quartz probe into the plasma flame to receive and transmit sound pulses which are converted to temperature measurements.

Avco developed the instrument to test ablative materials for re-entry nose cones (for the Titan and Minuteman ICBM). But they also suggest it for flame-spraying refractory oxides and ceramics, high-temperature materials testing, spectroscopic studies.

BEHIND THIS VALVE...

four ways you save with CARBIDE'S ethanolamines

No idle claims!—just four facts that show how you save with CARBIDE's ethanolamines:

HIGHEST QUALITY . . . means trouble free use—less down time and waste. Quality is assured because CARBIDE's ethanolamines are triple-tested—after production—during storage—and on shipment.

DELIVERY ON TIME . . . fills your inventory needs and meets your production schedules. With 50 warehouses, 18 bulk stations, and 2 producing sites—plus a rapid communications network—CARBIDE is your most reliable source for ethanolamines.

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TECHNICAL SERVICE . . . helps save your time in application research and production. CARBIDE has the most ethanolamines experience—34 years—and a technical laboratory staff of experts ready to help you.

A new booklet on CARBIDE's Alkanolamines and Derivatives is now available. Application information is combined with physical properties specifications, and shipping data, to give you the ethanolamines story at a glance. Ask your CARBIDE Technical Representative for a copy, or write: Union Carbide Chemicals Company, Room 328, Department HW, 30 E. 42nd Street, New York 17, New York.

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Market Newsletter

CHEMICAL WEEK
August 1, 1959

Price of n-butyl lithium was last week slashed to \$18.50/lb.

(500 lbs. or more in returnable containers) from the original \$50-90/lb. level by Lithium Corp. of America. Although a cut was anticipated (*CW Market Newsletter*, July 11) following recent startup of n-butyl lithium production at the firm's new Minneapolis plant, trade observers were surprised by the size of the decrease—a tab around \$30/lb. had been expected. Reason for the big reduction: “We can sell at \$18.50 and still make money.”

Although all volume prices were cut, the \$18.50 tag applies only to large volumes—and there are few big-volume buyers at present. In any case it should be an inducement to prospective users who have been discouraged by high prices. Here are prices for smaller volumes: 300-499-lb. lots, \$20/lb.; 100-299 lbs., \$22.50/lb.; 50-99 lbs., \$25/lb.

LCA's only competitor in the n-butyl lithium business—Foote Mineral—tells *CW* that it has already quoted a similar price level, unofficially, to prospective large-volume customers. Foote, however, won't quote a down-to-the-penny price but insists it is competitively on a par with LCA, believes that large-volume orders are distant, that specific quotes are premature.

What are the chances for further price cuts on n-butyl lithium?

No cuts in the near future. But there's an outside chance some buyers might eventually get better buys—if their applications permit use of cheaper solvents vehicles for the n-butyl lithium rather than the highly purified and relatively costly n-heptane now used.

•
Hydrazine supplies are not adequate for full-scale effort on a rocket engine-development program. That's the provocative statement by R. J. Thompson, manager of Rocketdyne's research section at Canoga Park, Calif.

“In my opinion,” Thompson explained to *CW*, “the current supply of hydrazine is adequate for research and development activities in the laboratory, for low-thrust rocket engine development and perhaps for initial development on a high-thrust engine. But the supply is not adequate for full-scale effort on a large engine-development program.”

Characterizing hydrazine as an “outstanding engine propellant,” Thompson underscored the chemical's value as storable liquid propellant, says its practicality for space flight applications has been demonstrated.

There's hope that the hydrazine impasse can eventually be solved, Thompson says. Using only currently known manufacturing methods (there's hint of a less-costly process in the offing, *CW*, July 25, p. 41), hydrazine is significantly more expensive than petroleum derived fuels. But it's still cheaper than other high-energy superfuels being investigated.

Market Newsletter

(Continued)

Concludes Thompson, "By a combination of larger-scale production, plus improvements in the manufacturing process, it should be possible to reduce cost significantly."

Oronite Chemical has produced terephthalic acid on a commercial scale at its Richmond, Calif., isophthalic acid plant, company officials this week disclosed to *CW*. By achieving technical success in converting the plant to TPA production, Oronite becomes the nation's second producer of the acid (Du Pont now makes TPA mainly for its own Dacron requirements; Amoco is another potential producer, might make it at Joliet, Ill.).

The switch from isophthalic to terephthalic production is said to require only minor adjustments in the final purification step; feedstock for making isophthalic is *m*-xylene, for making terephthalic it's *p*-xylene.

Meanwhile, Oronite has switched its TPA-IPA plant back to full-scale isophthalic acid production, pending completion of a market study of domestic terephthalic acid demand (it's already clear that polyesters—including fibers—will represent the major end-use for TPA).

Terephthalic so far turned out by Oronite is slated for Japanese manufacturers of polyester-type fibers (similar to Dacron). The TPA sent to Japan will fill a raw-materials gap until Mitsui's TPA plant comes fully onstream; the fiber itself will be made by Teikoku Rayon and Toyo Rayon. Additional amounts of TPA will be made for the Japanese if it's needed, say Oronite spokesmen.

Doubling of liquid polymer polybutene capacity to an estimated 2 million gal./year has been completed at Cosden Petroleum's refinery at Big Spring, Tex.

Meanwhile, Cosden has licensed its process to potential producer Texas Butadiene and Chemical. TB&C plans to manufacture polybutene at its Channelview plant near Houston; but company spokesmen say that definite construction plans can't be announced yet, although, according to Cosden, a successful demonstration run—using TB&C feedstocks—has been completed at Cosden's Big Spring refinery. Adds Cosden: "We will market TB&C's entire polybutene output."

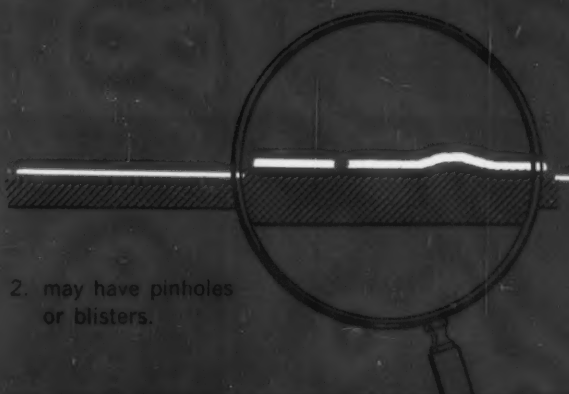
SELECTED PRICE CHANGES—WEEK ENDING JULY 27, 1959

	Change	New Price
UP		
Citronella oil, Ceylon, dms.	\$0.05	\$0.65
Olive oil, edible, dms., gal.	0.10	2.50
DOWN		
Mercury metal, 76 lbs. per flask	\$1.00	\$236.00
Oleo oil, extra, dms.	0.005	0.14
Ouricury wax, crude, bgs.	0.02	0.74

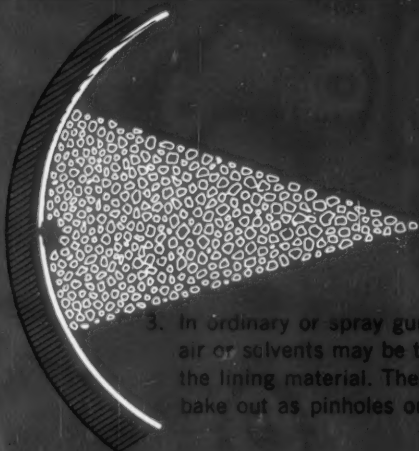
All prices per pound unless quantity is quoted.



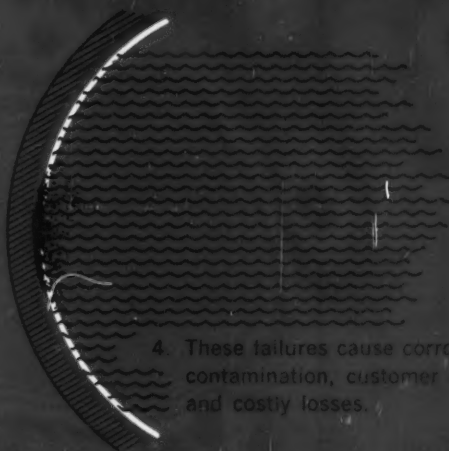
1. The lined drums you buy



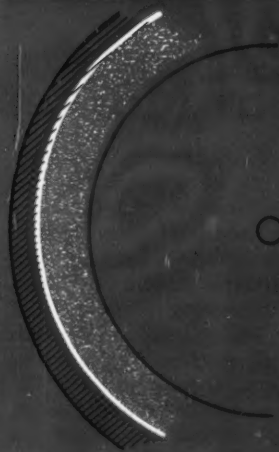
2. may have pinholes or blisters.



3. In ordinary or spray gun application, air or solvents may be trapped in the lining material. These later bake out as pinholes or blisters.



4. These failures cause corrosion, contamination, customer complaints and costly losses.



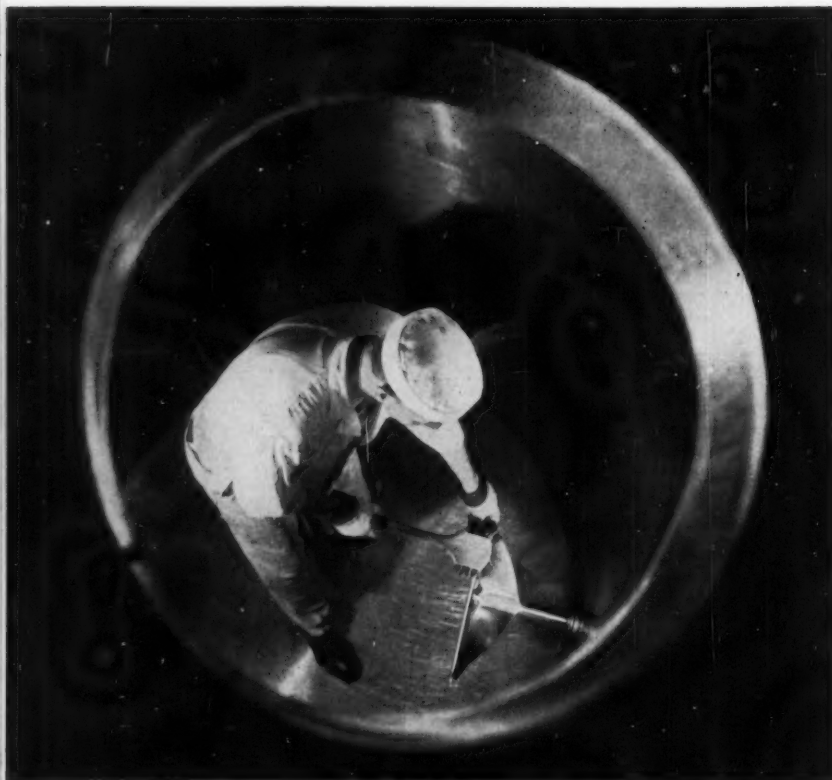
5. Rheem Centrifugal Spray uses no air and the solvent content is vastly reduced. The result:

**NO PINHOLES
NO BLISTERS**
In drums lined by
**RHEEM
CENTRIFUGAL SPRAY**

And that's not all. For more than three years, Rheem Centrifugal Spray has been delivering lined drums free of thin spots and globs or skips. Air turbulence is eliminated. Human error is eliminated. Lining thickness is controlled to within 1/10 of a mil. Linings are cured by unique Rheem Vertical Curing in three stage, high temperature ovens. For more information, or help in developing a lining for a problem product, write the world's largest manufacturer of steel shipping containers at 1701 West Edgar Road, Linden, New Jersey. Plants across the country . . . Chicago, Houston, Linden, New Orleans, Richmond, Calif.; South Gate, Calif.; Tacoma. For other sales offices see the Yellow Pages.



SPECIALTIES



CLEANING COMPOUNDS

What One Dairy Uses Per Year

(July 1958-1959)

Product	Lbs.
General-purpose cleansers	29,862
Bottle-washing compounds	29,405
Special pasteurization cleansers	15,296
C-I-P compounds	3,820
Milk-can-washing compounds	3,895
Truck cleansers	130
Scouring powder	210
Liquid chlorine solution-sanitizer	1,990 gal.

(Based on processing 5,000 gal./day fluid, 2,000 lbs./day by-products)

Dairy Specialties: \$50-Million/Year Market

This month about five billion quarts of milk will be processed in more than 15,000 U.S. dairy plants. And, once each day, every piece of equipment with which this flood of milk comes in contact must be both cleaned and sanitized—about 25% of dairy operating expense and 33% of man-hours will go into keeping the dairy clean. This scrubbing furnishes a \$50-million/year market for chemical specialty products.

Changing processes and equipment, lack of uniformity in state and city sanitary codes governing product use, plus shifts in popularity of certain type products all keenly affect marketing of specialties for the growing milk industry. Here are some of the factors involved:

It Takes Two: In dairy cleaning, there are two main objectives: cleaning and sanitizing. The Borden Co. makes this distinction: "The cleaning procedure is intended to free surfaces

of all chemical contamination, both organic and inorganic, as well as most microbial life. Sanitizing is the precautionary measure whereby microbial life which failed to rinse from the surfaces during the chemical procedure is destroyed either by chemical or physical means."

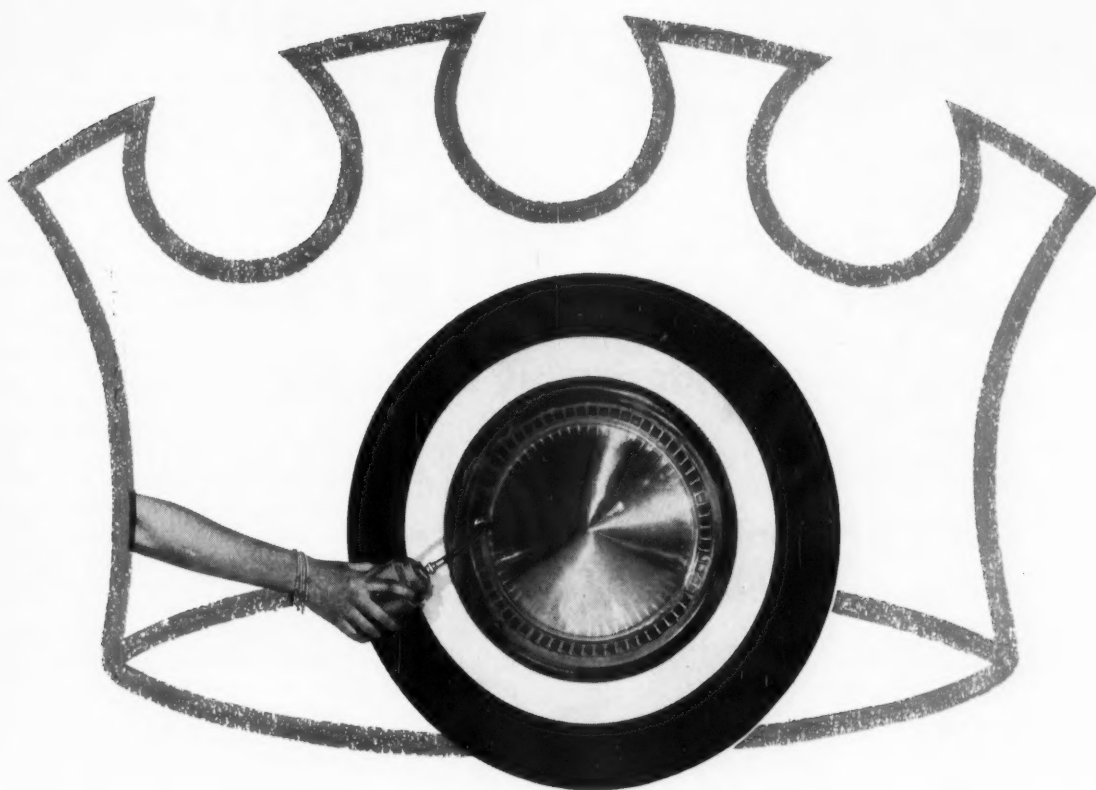
The general-purpose cleansers used for today's stainless-steel plant equipment are mainly alkaline detergents in powder form to which wetting and sequestering agents and emulsifiers have been added, depending upon water conditions. However, there is a trend toward the use of liquid detergents. According to Ken C. Tucker, manager of the Food Products Division of Oakite, a liquid wetting agent "eliminates bulk dry storage problems, and cuts freight costs because of its concentrated form." On the other hand, many plant superintendents do not want to pay for water content in a cleanser and find liquid

detergent costs are relatively high.

Once all dairy equipment was cleaned by hand, using light-duty alkalies which would not harm the skin. The trend in today's high-cost labor market is toward mechanized clean-in-place operations (circulation of cleaning solution through specially constructed pipelines). This is shifting emphasis to heavy-duty alkalies. But a new problem is thereby added. Cleansers and sanitizers must not damage the stainless-steel equipment and piping which is practically standard in the industry.

Although there is also a trend toward development of specialty products which will clean and sanitize simultaneously, the public health officials in most states have rejected this approach, say that cleaning and sanitizing must remain separate, except perhaps at the farm level.

Who Sets Standards: Even before any sanitizing product can be mar-



Aerosol Containers* by Crown

open profitable new markets

Fully inflate a flat tire in seconds. Thousands and thousands of motorists have seen the value of this new aerosol product which provides this convenience, anywhere, any time, easily.

Ideal for bicycle tires, wading pools and other home uses, too. The container, of course, is made by Crown, pioneer and world's largest manufacturer of aerosol cans.

Hundreds of liquids, semi-liquids and gases, marketed in pressurized containers, are bringing new profits to their manufacturers. Are your products among them?

Your inquiry will be answered promptly.

*Only Crown manufactures both fabricated and seamless Spra-Tainer aerosol containers.

CROWN

for cans • crowns • closures • machinery



CROWN CORK & SEAL COMPANY INC., 9300 Ashton Road, Philadelphia 36, Penna.

Can Baker

AMMONIUM THIOCYANATE

help solve your problems of
CORROSION · SYNTHESIS · PURIFICATION?

Baker Ammonium Thiocyanate, Technical, Crystal or 50% Solution, is a versatile chemical employed by many industries to help solve vexing problems of corrosion, synthesis and purification.

If you have a similar problem in your processing, you may profit by exploring the unusual capabilities of this many-purpose Baker chemical. You will find it economical to buy, easy to handle, and always in dependable *tonnage* supply.

EFFECTIVE

as a **CORROSION
INHIBITOR**

Ammonium thiocyanate is used extensively as a corrosion inhibitor for steel tanks and equipment employed for the storage and transportation of ammoniating liquors. Recent studies confirm that Baker Ammonium Thiocyanate at concentrations greater than 0.1% by weight, *reduces* the corrosion rate of ammoniating liquors at 30°C. (86°F.) to about 0.02% of the uninhibited rate.

VERSATILE

in **SYNTHESIS**
as an **INTERMEDIATE**

1. *The Thiocyanate group* can be introduced into many organic compounds by reaction of ammonium thiocyanate with the corresponding halide.
2. *Thiocyanogen* can be generated by the electrolysis of an aqueous solution of ammonium thiocyanate.
3. *Aromatic thiocyanates* can be prepared with ammonium thiocyanate with the aid of chloramides.
4. Some amine salts react with ammonium thiocyanate to give the corresponding *amine thiocyanates*; some yield the corresponding *thioureas*.
5. Ammonium thiocyanate can be reacted with: Dicyanamide to yield *guanidine thiocyanate*; Nitrites to yield *amidines*; Acyl derivatives of α -amino acids to yield *2-thiohydantoins*.

EFFECTIVE

in **ZIRCONIUM
PURIFICATIONS**

Ammonium thiocyanate is employed in a purification of zirconium. Zirconium and hafnium thiocyanate complexes are selectively extracted.

Because Baker controls all the raw materials that go into Baker Ammonium Thiocyanate, you are always assured of uniform quality and scheduled availability.

AVAILABLE IN TONNAGE:

Baker Ammonium Thiocyanate, Technical, is available in crystalline form by the truck-load and carload in 200, 100 and 25-pound fibre drums, with polyethylene-liners. The 50% Solution is shipped in 8,000-gallon specially lined tank cars.



PURITY BY THE TON — for production use

BULLETINS AVAILABLE

Baker Product Data Bulletins on ammonium thiocyanate provide valuable information about its many industrial applications. Bulletin 102 is a research report on ammonium thiocyanate as a corrosion inhibitor for nitrogen solutions. Bulletin 101 gives data on general properties and uses. We will be happy to send you either or both bulletins as well as price information.



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You get something extra with Wyandotte Chlorine

...a guarantee of satisfaction goes with every sale

The guarantee you get with Wyandotte Chlorine is possible for just one reason: We're mighty hard to please ourselves!

Our chlorine is pampered every step of the way; it is rigidly controlled from basic materials to finished product delivered to your plant; and it is backed by the skilled technical service that is an integral part of the Wyandotte way of doing business.

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Wyandotte CHEMICALS

MICHIGAN ALKALI DIVISION

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SPECIALTIES

throughout the U.S. calls for several approaches. If the dairy is part of a big chain, purchases are more likely to be made directly from a few large suppliers. Small plants, however, are more likely to buy from a jobber who specializes in these products. (A rough estimate of the division in sales: 60% through jobbers, 40% through direct sales.)

In checking with several dairies, *CW* found no set pattern of buying. Each Borden plant, for example, selects its own products on the basis of performance. Although Borden's own Tycor Division makes both cleansers and sanitizing products, the individual Borden plant is free to select another company's product, once its use is justified to the Borden Farm Products Division.

On the other hand, W. G. Fisher, assistant vice-president of Carnation Co. (Los Angeles) told *CW* that his company buys most of its specialty cleaning and sanitizing products from chemical manufacturers on the basis of bids. The company has its own formula general cleaner, purchases it from Bonawitz Chemical. It's used at the rate of 3,000 lbs./month. Carnation's acid cleaner is purchased from E. F. Drew Co.; C-I-P (clean-in-place) cleansers, bottle and tank cleansers from Diversey (Chicago).

Carnation told *CW* it uses about 20 different items for cleaning purposes, and purchases about \$3-million worth annually for its approximately 150 plants that are located throughout the nation.

It buys largely phosphates and detergent-type cleaning compounds. Carnation's control laboratories provide the purchasing department with a list of approved products. About half of these are made according to Carnation specifications; the other half are standard materials offered by manufacturers.

Another Coast operation, Petaluma Cooperative Creamery, said it spends \$11,000 yearly on cleansers and sterilization products. The company said it used to buy from major suppliers such as Wyandotte, Turco, Diversey, Oakite and Continental Chemical; now it does its own basic compounding to provide closer control. By centralizing the supply of its cleaning compounds, the company claims it has cut costs to the extent that it isn't spending any more for a \$12-million

business than for a \$6-million one.

Petaluma, which processes about 250,000 quarts/day, said that it now uses four major items—60,000 drums/year of general cleaner high in polyphosphate and wetting agent suitable for hand operations. For all circulating and cleaning of hot and cold equipment, it uses 40,000 drums/year of a compound of 97½% caustic soda, 2% glutinate and ½% nonionic wetting agent.

For sanitizing, Petaluma now uses 9,600 gals./year of a basic 16% sodium hypochlorite solution; and for milkstone removal, 150 drums (300 lbs. each)/year, of a 55% food-grade phosphoric acid with 1% wetting agent compatible with acid media. However, the company said, it still uses a prepared Wyandotte product for the lab ware and testing equipment.

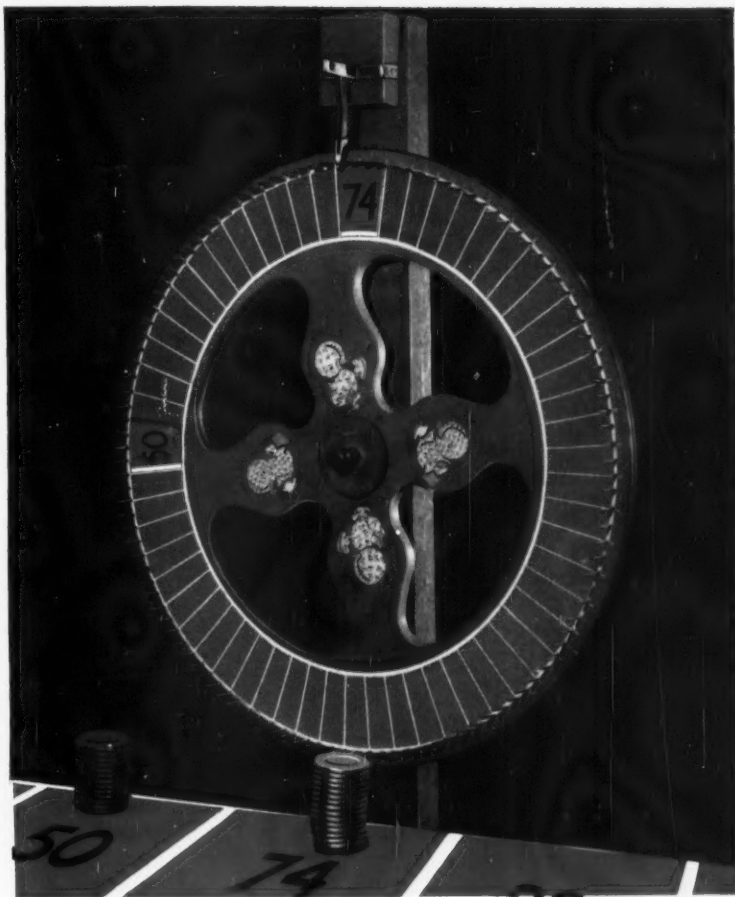
Spreckels-Russel, also a West Coast dairy, told *CW* that to keep its 15,000 gal./day operation clean it uses about 15 bbls./month of trisodium phosphate and the same amount of an all-purpose detergent powder. For a milkstone remover, it uses phosphoric acid combined with a rust inhibitor to protect its metal equipment.

Short-order Specialists: According to several companies, most dairies do not like to stock more than a three months' supply. Dampness in the plant causes product deterioration and caking in the case of powdered products, while the quantities used require large storage areas. Therefore, the big supplier with his many warehouses and quick delivery has a built-in advantage.

Technical service, too, could be a key to sales. One company said that good technical service can even obviate a sanitation engineer—a big expense for a small plant.

Bigger Combines: Though the small individual dairy is far from being a thing of the past, the dairy industry, like many others, is merging into fewer and larger groups. This means more multiplant buying by large companies—and more cooperative purchasing by groups of independents to keep costs competitive. This will mean that the big specialty companies selling to this field will get bigger, while the smaller ones will have a more difficult time.

But milk consumption is on the increase. Therefore, whether they get the top of the bottle or have to fight over the skim, both small and large specialty makers will be going after a steadily increasing market.



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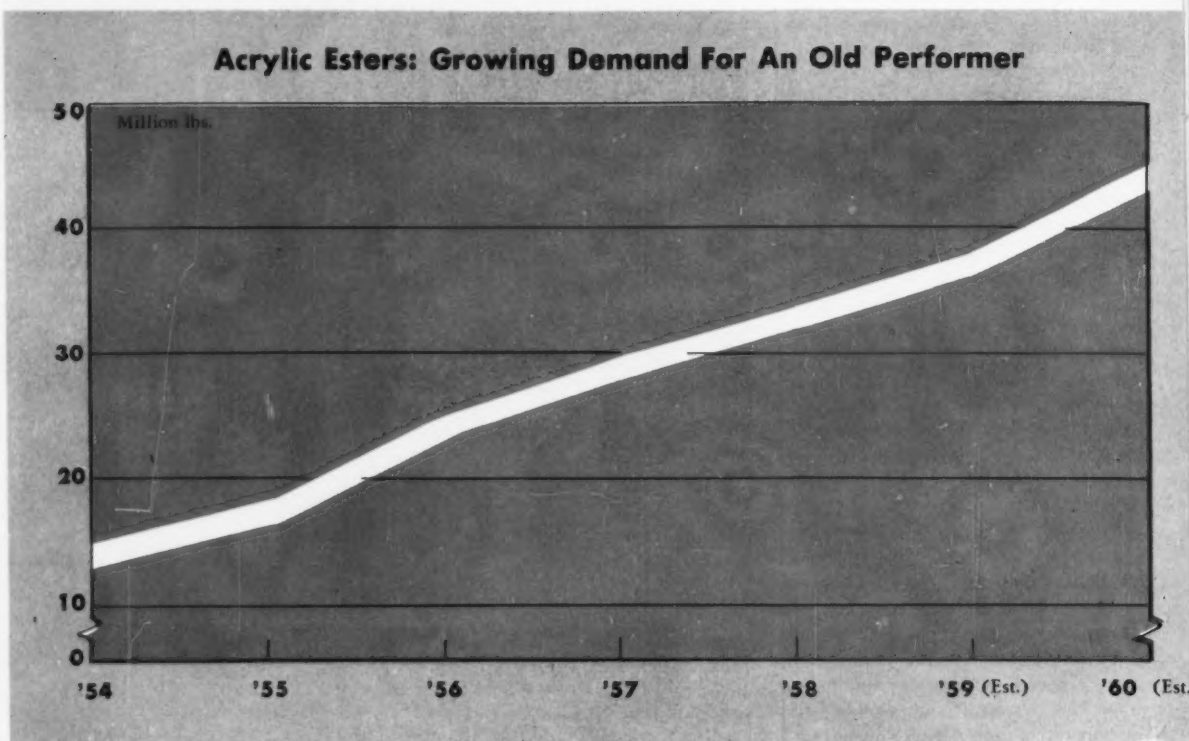
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PACING PROGRESS WITH CREATIVE CHEMISTRY

Acrylic Esters: Growing Demand For An Old Performer



Acrylate Demand Rise—Too Slow

The U. S. acrylate market is getting renewed attention this week, as the industry tries to determine the impact of Dow Badische's now-abuilding plant, (CW, Business Newsletter, July, 11). Reason: present installed acrylate capacity is already more than ample—almost twice demand.

DB's plant, at Freeport, Tex., is scheduled for startup about the first month of next year. Although no official figures have been reported, trade estimates of capacity are about 15 million lbs./year. Added in with the estimated output potential of other producers, it brings industry capacity to around 80 million lbs./year.

Largest acrylate manufacturer is Rohm & Haas, which has two plants at Deer Park, Tex.—total estimated capacity, 35 million lbs./year. Celanese's plant at Pampa, Tex., is reported to be able to turn out 14-15 million lbs./year of acrylates, while Union Carbide's estimated capacity is about 16 million lbs./year.

DB's product line will be essen-

tially the same as other acrylate producers — acrylic acid and its esters, e. g., methyl, ethyl, butyl and some higher acrylates. And, although the company will reportedly aim for the same markets as these other manufacturers (see p. 61), there's no doubt its main interest will be in paints.

Paint Brightest: That's because the largest outlet for acrylics is water-thinned paint. Trade estimates put total '58 consumption for this use at about 9 million lbs. And paint manufacture stands out as the largest potential market for acrylics.

But, premium prices now commanded by acrylates throw up a serious obstacle to their wider acceptance by the highly cost-conscious paint industry — especially since paint producers can use two other polymers that are much less expensive. These costs are reflected in current paint prices (dry basis): acrylate latex paints about 42¢/lb.; butadiene-styrene and vinyl-acetate homopolymers, about 29¢/lb.

Some polymer producers are trying to circumvent the high price problem and also retain many desirable acrylate properties—e.g., good particle size, pigment binding — through the use of copolymers, notably with low-cost vinyl acetate. Current quotes for this type: 33¢/lb. (dry basis).

DB's approach is likely to employ another copolymer system — the styrene-acrylics. Monsanto has long promoted this type of latex, with its Lytron 680. Reports also indicate that Dow's acrylic-based latex paint contains styrene. The product, temporarily tabbed Latex X-2647, is now a full sales item, called Dow Latex 2647.

Here's Dow's position: At present, it has large facilities for the production of the styrene monomer; it has also been a pioneer in the development and marketing of butadiene-styrene paints. With this type of paint in a sales battle with vinyl acetate and acrylic latexes, Dow may well be seeking new products, not only to compete in the paint market, but also

Estimated Plant Capacity Acrylic Acid & Esters

Plant	Location	Capacity (million lbs.)
Rohm & Haas	Deer Park, Texas	35
Celanese	Pampa, Texas	15
Union Carbide	Institute, W. Va.	16
Dow Badische	Freeport, Texas	15
Goodrich Chemical	Calvert City, Ky.	3*
Total		84

*Produces only the acid.

Estimated '58 End-Use Pattern for Acrylic Esters (figures in million lbs.)

Paint	9	Polymer-based	
Leather	7	polishes	1.0
Paper	2.5	Specialty rubbers	
Fibers	6	and plastics	4.0
Textiles	3	Pharmaceuticals	
Adhesives	0.7	and others	1.0

to Catch Capacity?

to boost styrene sales above present levels. Butadiene-styrene latexes are now estimated to command around 60% of the water-thinned paint market, while vinyls account for about 27-29% and acrylics around 11-13%.

Although acrylics are competing for both interior and exterior paint markets, their greatest area of growth is expected to be in the home-exterior market — particularly, the frame-home market. Already, at least one major U. S. paint maker, National Lead, is offering both an indoor and outdoor type of acrylic-based paint; National also produces its own polymer from purchased monomers.

Another growing outlet is the industrial finish field. Reports are that this market is steadily increasing its annual demand for using more and more water-thinned latexes.

Acrylate Boost: Considerably plumped by paint demand, total acrylate sales have grown steadily during the past few years. Consumption in '58 was estimated at about

34 million lbs., a 140% increase over the '54 figure. And, continued growth is forecast for the next few years, with demand in '59 expected to reach 37-39 million lbs. Outlook for '60 is more encouraging, with forecasts in the 45-50-million-lbs. range. But, with four monomer manufacturers in the field, competition will be keen. And, even with the growing markets, overcapacity for some producers will no doubt be a problem. Only in longer range forecasts does solid hope for all appear; consumption between '60-'65 is expected to grow rapidly. By '65 most observers expect that it will almost equal capacity—including DB's output.

One other segment of this acrylic market—polymer emulsion polishes—now seems to offer good growth potential. Current trade estimates put consumption of acrylates in this market at about 750,000 lbs., although some believe the market to be larger—possibly as high as 2 million lbs.

According to Dan Witwer, of

Polyvinyl Chemical (Peabody, Mass.), acrylic polymers are now widely accepted in the floor polishing industry, and if the trend to colorless, clear floor finishes continues, there should be a growing demand for this type of polymer. Polyvinyl Chemical was one of the first companies to develop an acrylate polymer for floor polishes.

S. C. Johnson is also deep in the acrylic-polish business. The company launched its first acrylic-based household polish (Klear) in '57. Meanwhile, it has started producing its own acrylate polymers.

CW also learned this week that National Starch has started marketing a new floor-polish polymer, labeled Resin 2700.

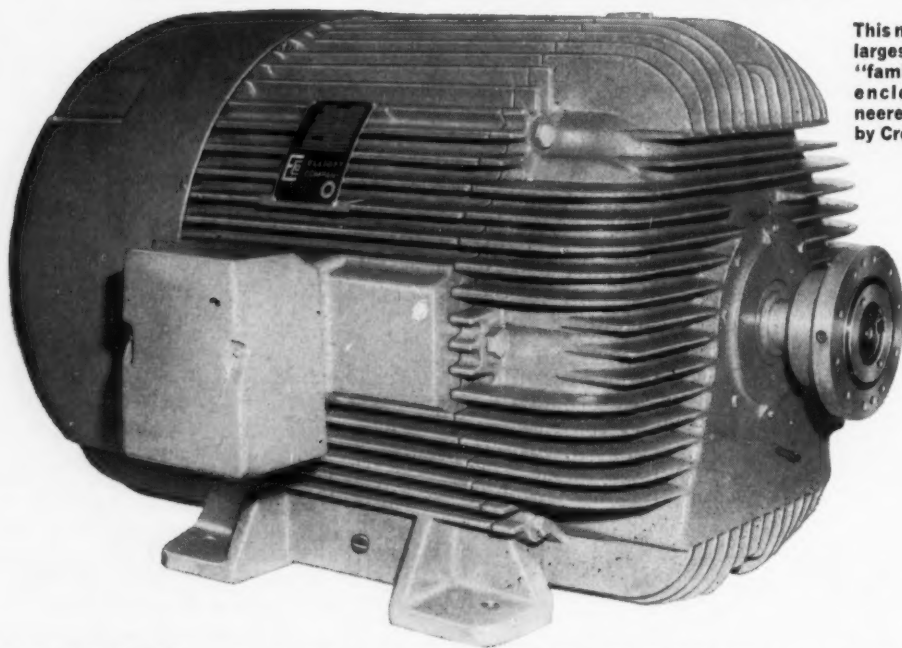
Weight Going Up: At present, ethyl acrylate is the most important ester in the acrylate group, apparently has the greatest near-future market potential. One reason: it's the least expensive. However, manufacturers are also seeking new markets through the development of some of the higher esters. And, this week, Union Carbide revealed that it will shortly offer two new esters, glycidyl acrylate and 2-ethylpyridylethyl acrylate. Prices have not yet been established.

One point of confusion in the industry concerns the location of Rohm & Haas's producing plants, since material is often quoted f.o.b., Bristol, Pa., or Knoxville, Tenn. The answer is that acrylates are shipped from R & H's two Deer Park units to the above plants, from which supplies can then be diverted or reshipped at the seller's option.

Price Cuts Coming? One big problem now pondered by acrylate marketers concerns the impact of DB on prices. The high excess of capacity, increased competition, cost-limited markets, the trend among acrylic polymer consumers to go basic, and previous years' downslide of acrylate prices, leads many observers to believe that tabs on the monomers will be lowered within the next two or three years.

Right now, of course, no acrylic maker will talk about dropping prices. But, there is no question, according to market observers, that lower prices could help spark wider acceptance of these products, be the real key to the future of acrylates.

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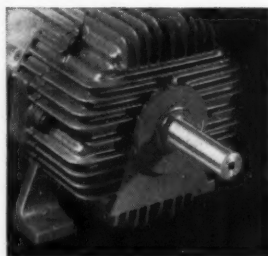
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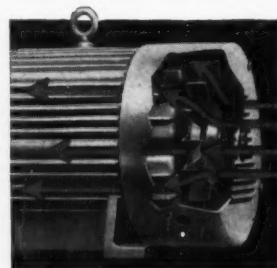
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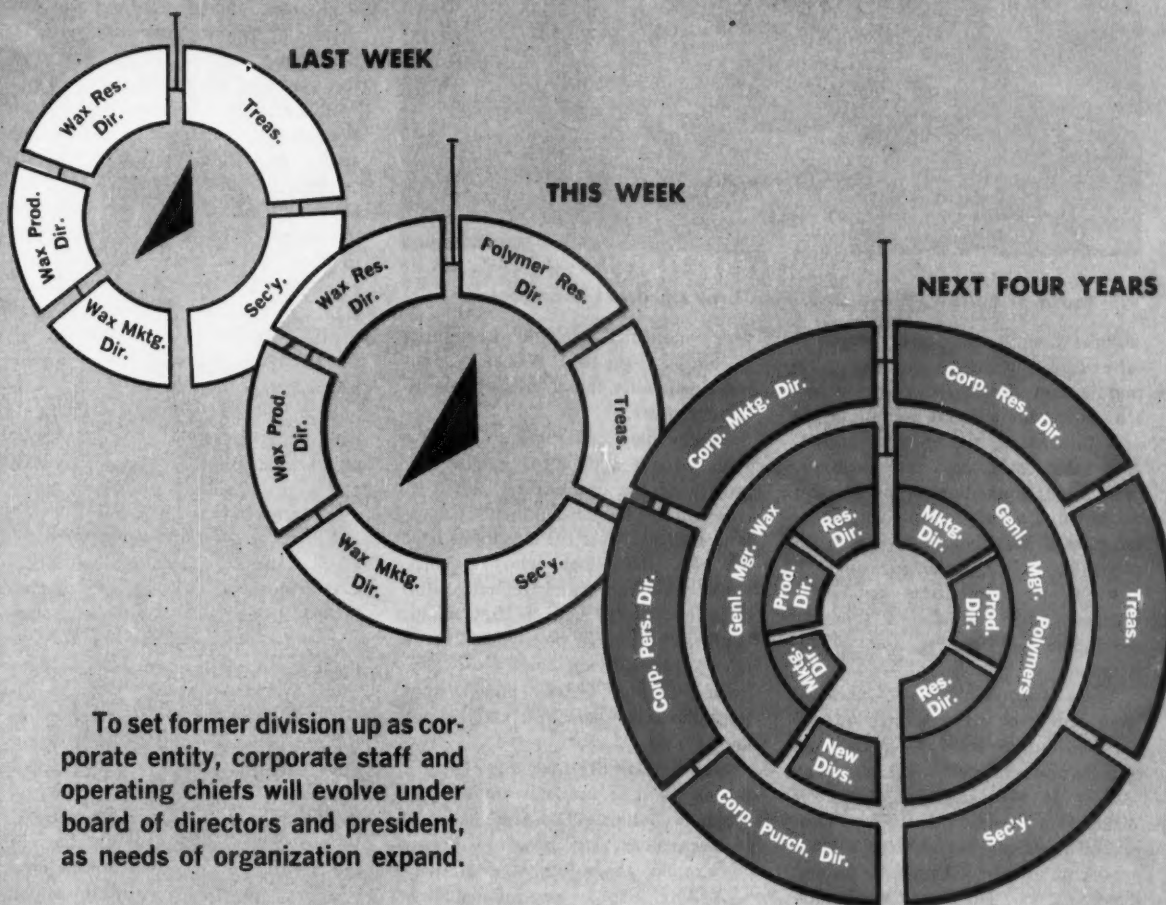
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ADMINISTRATION

Western Petrochemical's Growing Ball of Wax



To set former division up as corporate entity, corporate staff and operating chiefs will evolve under board of directors and president, as needs of organization expand.

Embryo Company Preorganizes for Growth

When a former company division becomes an independent corporate entity, it faces some unusual problems. The major one: preserving continuity of sales and operations while planning and developing corporate staff activities previously supplied by former management.

These problems have been tackled by the newly formed Western Petrochemical Corp. which, with the help of a consultant, Harbridge House (Boston), has formulated a plan for corporate growth during the next five years.

This week saw one of WP's first moves to implement this plan: the creation of a new Polymer Division.

And who is Western Petrochemical? It's a corporation set up to finance and manage the operations of the former Warwick Wax Division of Sun Chemical Corp. It got its start last February* when it was mutually agreed by Maurycy Bloch (then Warwick's general manager) and Sun's top management that the

* The decision was a second turning point for Warwick. It was an early acquisition in the post-World-War II diversification activities of Sun Chemical—formerly General Printing Ink.

operations of Warwick were diverging from other Sun interests. As a result, Bloch got the opportunity to strike out on his own.

Here's what Bloch has accomplished so far:

- Created a "working" board of directors, whose individual skills and experience could contribute much to tide the firm over the managerial hiatus between Sun and a going firm.

- Hired management consultants — Harbridge House — to help the company plan its future, best utilize current manpower, provide needed



CW PHOTO—LIONEL CRAWFORD

WP team of Sellw, Bloch and Fish (l. to r.) direct changeover.

services such as manpower appraisal, advertising planning, market research, and advise the company on structuring for efficient operations.

- Initiated a management organization that could, on a skeleton basis, provide for immediate administrative needs while a fully oriented management staff was being developed to perpetuate policy, foster growth.

- Set up committees to advise management in the areas of scientific development, marketing and administration.

These are composed of management, suppliers, and customers whose knowledge of their various fields could provide up-to-date, thorough guidance.

How It Works: When Warwick Wax was a Sun subsidiary, Bloch, as general manager, reported to a vice-president of the Chemicals Group. Reporting to Bloch were a director of research, and a combination director of refining and sales manager; beneath them were the appropriate personnel who operated plants, managed sales territories, and the like.

To face WP's immediate operating problems, an executive committee was formed consisting of a board chairman, president, vice-president and several directors.

Bloch and the man who had held the director of refining-sales manager job, John Fish, took on extra duties. Bloch, as president, doubled in brass as general manager and marketing director, while Fish became vice-president for research and technical services, acted as director of refining.

Added to the managerial superstructure were a secretary and a treasurer, the latter nominated by the

firm's financial backers. Remaining portions of the old Warwick setup remained fairly intact, fitted in under these officers.

Meanwhile Harbridge House sketched out a plan for guiding the growth of the outfit. First, attention was given to the development of manpower to take over the extra jobs held by Fish and Bloch who, in turn, would train successors, relinquish the doubling jobs as soon as they could. With the creation or acquisition of new divisions, Bloch would once again assume division general managership until the new segment could be put on its own.

Germination: Though this plan has not as yet been precisely followed in the new Polymer Division, its chief features have been observed. Bloch still remains general manager of Warwick Wax, assumes general managership of WP's Polymer, with Norman Gaylord as director of research. Presumably, as the new division generates products and plants, Gaylord — a polymer chemist and former assistant director of Interchemical Corp.'s organic chemistry department—could move up as general manager.

For the future, in line with expansion, the company will take on traditional corporate aspects. Basic structure aimed for will have corporate directors of new-product research, marketing, personnel, purchasing, as well as the posts of secretary and treasurer. The second echelon, also reporting to Bloch, will be comprised of the general managers of the operating divisions, to whom will report production, research, sales and accounting person-

nel at the company's divisional level.

Other Roles: Other roles will continue to be played by present participants. Harbridge House will not withdraw from the picture, but its activities will become less direct. Right now, though, it's working out details of training and management development plans, and assisting in the appraisal of potential managers.

Still another important segment of Western Petrochemical's management setup, according to Bloch, is its "working" board. An idea of its character can be inferred from some of the people who are on it, in addition to Bloch, who himself has had much experience in the wax field. Board Chairman William Sellw, a partner in the investment banking firm of G. H. Walker & Co., has devoted his career to investment work.

Fish and Gaylord are board members, as is Herman Mark, professor of chemistry at Brooklyn Polytech, and a prominent consultant in polymer chemistry.

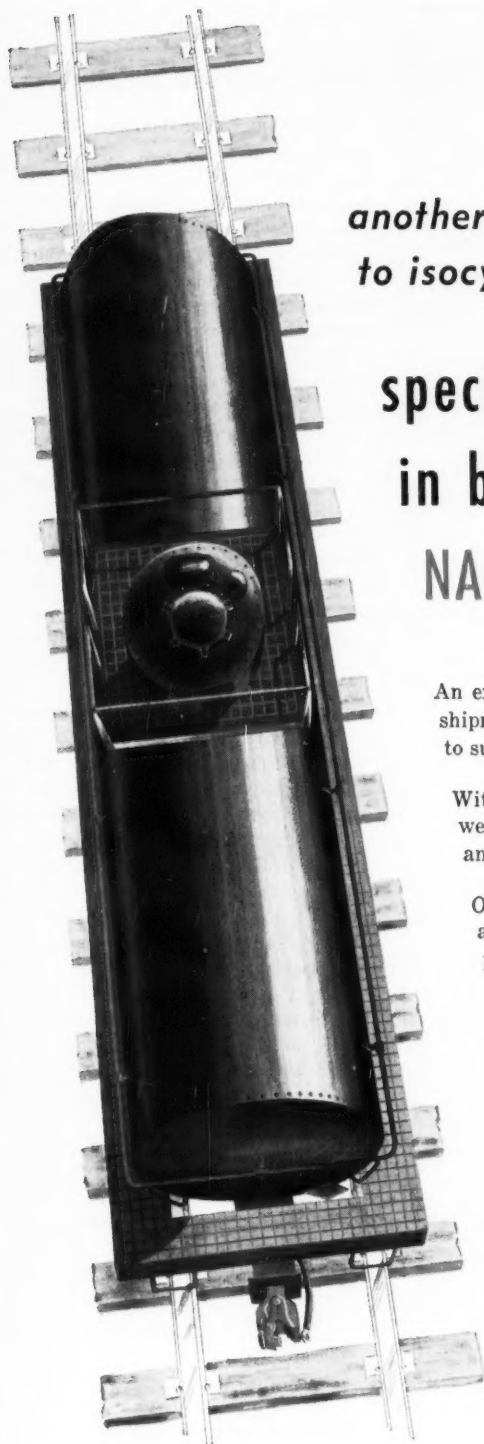
Harbridge House is represented by Peter Temple, a vice-president.

It's Bloch's announced philosophy that he'll get the best people he can afford for the jobs at hand, give them as free an atmosphere as possible for the work.

Waxes will be the starting point for the new Polymer Division. Gaylord and Mark will visit principal Warwick Wax customers, discuss what new properties will be required in the wax products they'll buy in the future, then try to determine how waxes can be treated so that—either alone or in combination with other materials—they will measure up to the desired specifications.

But this is only the first stage of the new division's operations. Its longer-range objective is to size up the economic feasibility of making entirely new emulsion polymers, molding powders or other polymer products. Gaylord says a number of petroleum companies have been calling his attention to various refinery waste products that could serve as raw materials for such projects.

Outcome: Result of all this planning must be measured by performance, and so far there's been little chance for evaluation. On paper, however, newly formed Western Petrochemical seems to know where it's heading.



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ADMINISTRATION

Spevack Motion Denied

Chief Justice Earl Warren last week denied an eleventh-hour attempt by New Rochelle, N.Y., inventor Jerome Spevack to hold up dismissal of his case against the Atomic Energy Commission. The case was due to expire July 21 with issuance of Spevack's patent for an improved process for making heavy water (see p. 45).

Spevack had attempted to block dismissal of the case until AEC complied with provisions of an earlier court decision requiring it to submit to Spevack flowsheets and diagrams of AEC's Dana heavy-water plant, before and after its conversion by the Dept. of the Army (CW, June 20, p. 130). The material was to pertain to facilities utilizing the heavy-water process in order that Spevack might determine how much, if any, of his process is to be incorporated in the converted plant.

Earlier Spevack had asked the U.S. district court at Washington, D.C., to suspend dismissal of the case until AEC gave him material and information allegedly supplied prospective contractors, including Food Machinery & Chemical Corp. The court ruled that Spevack's motion was premature in that the conversion had not taken place. Advantage of having flowsheets and diagrams before and after conversion, the court said, is that a comparison can be made. Spevack argued that if he did not get the information before the case was dismissed, his chances of getting it at all would be lessened.

Spevack's lawyers indicated that they might file suit at a later date, if AEC and the Army fail to live up to the court order as Spevack sees it—meaning, apparently, if Spevack is not permitted to determine if his process is incorporated in the converted Dana plant.

LABOR

Viscose Settlement: American Viscose Corp. has granted a three-step series of pay raises to 2,000 hourly workers at its Fredericksburg, Va., plant. The new contract, which runs until March '63, provides for immediate raises of 11-14¢/hour, increases of 6¢/hour in July '60, 7¢ in July '61.

Also granted were longer vacations

for 25-year workers, some revisions in the formula for calculating vacation pay, liberalization of eligibility requirements for holiday pay, and lowering of the age requirement for disability pay. The new pact came after extended negotiations between the firm and the Textile Workers Union of America, following completion of an agreement covering six other Avisco plants.

Dow Contract Approved: Dow Chemical Co. and the International Chemical Workers Union have approved one-year contracts for Dow's plants in Pittsburg, Seal Beach and Torrance, Calif.

The Pittsburg plant contract provides a 7¢/hour wage increase and additional fringe benefits, including increases in shift-differential pay and life insurance, and eight guaranteed paid holidays annually. Some 400 members of Local 23 were affected by the contract, which runs until May 1, '60.

Contracts at the Seal Beach iodine plant and the Torrance polystyrene plant follow the same general pattern, affect some 45 workers at each plant, run until June 1, '60.

KEY CHANGES

Charles A. Simpler to vice-president of sales, Ohio Chemical and Surgical Equipment Co., division of Air Reduction Co. (New York).

J. Q. Cope to vice-president—chemical products and processes—California Research Corp., subsidiary of Standard Oil Co. of California (San Francisco).

Wallace G. Brindise to general sales manager, **John Yuille** to controller, **Benjamin J. Jarvis** to vice-president in charge of production (Linden, N.J. plant), **A. Rolph Evans** to vice-president of research and development (Linden laboratories), all of R. D. Webb & Co. (Cos Cob, Conn.).

George S. Hills to director; **Hamilton Hadden, Jr.**, **Arthur W. Lucas** to vice-presidents; Chemstrand Corp. (New York).

Albert H. Cooper to director of research and development, Waverly Chemical Co. (Mamaroneck, N. Y.), pharmaceutical chemical maker.

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POSITIONS VACANT

Opening for research and development chemist experienced in manufacture and use of wax compounds, wax emulsions, resins, polymer dispersions, cleaners and household chemicals in a manufacturing company laboratory located in the Middle West. Apply by letter, enclosing photograph and giving full details of education and experience. All replies will be confidential. P-1975, Chemical Week.

Sales: Upper level position involves administration and sales with a well established chemical manufacturer. Challenging opportunity for industrious and inventive graduate chemist or chemical engineer with five to fifteen years' experience in chemical sales and sales management. Central location. All inquiries will be handled in confidence. Mail complete resume of qualifications to P-2128, Chemical Week.

Research Chemist PhD-Background may be organic, physical or biochemistry. Minimum of 5 years research experience in the broad area of natural products essential. A working knowledge of the relation between structure and odor would be invaluable and research experience with food products helpful. Established, progressive food manufacturer. Location—East. Salary \$10,500-\$12,500 plus profit sharing. Liberal company paid benefits. Send detailed resume in confidence. P-2209, Chemical Week.

Chemical Process Supervisors, Starting up, operating and training on Korean Urea Plant, Air Separation, Partial Oxidation, Shift Converters, Ammonia Synthesis, Urea Synthesis. Must have minimum 5 yrs. exper. Unusual chance to build a substantial nest-egg. Liberal Benefit Program. All inquiries confidential. Send detailed chronological resumes to: McGraw-Hydrocarbon (S&T), 161 E. 42nd St., New York, N.Y.

Development Engineer—Excellent opportunity for young graduate engineer with 2-3 years Process Development experience to join our expanding Nuclear Fuels Department. Previous nuclear fuels experience desirable but not essential. This is a challenging position as a development engineer, encompassing a broad area of nuclear fuels technology and offering the opportunity for future advancement. In reply, please send complete resume of experience, education, age and salary desired to: Personnel Manager, Spencer Chemical Company, 610 Dwight Building, Kansas City 5, Missouri.

Technical Service—An excellent opportunity for young man to join the Technical Department of the expanding Plastics Division of Spencer Chemical Company. This man should have a strong background in chemical engineering or chemistry, with a minimum of three years' experience in the field of polyolefins and nylon, and have intimate contact with field technical service work. In reply, please send detailed resume of experience, education and salary requirements to: Personnel Manager, Spencer Chemical Company, 610 Dwight Building, Kansas City 5, Missouri.

Polymer Chemist—Openings now exist for a chemist with experience in organic or physical basic work on polymers. PhD is desired or the equivalent in work experience. Permanent location in Akron, Ohio. Reply should give details of education, research background and salary required. Liberal company benefits including fully paid life insurance and hospitalization. All letters completely confidential and will be answered promptly. O. D. Taliaferro, Salaried Personnel—R M P The Goodyear Tire & Rubber Company, 1144 East Market Street, Akron 16, Ohio.

SELLING OPPORTUNITIES AVAILABLE

Chemical jobber upstate New York, fine well-established line Industrial Chemicals, requires services experienced Industrial Chemical Salesman. Liberal salary, commissions, expenses. Car furnished. Opportunity advancement. Chance to buy into company over the years. If experienced, send resume to SW-2107 Chemical Week. Our employees know of this advertisement.

Chemical Sales Representative—Expansion by prominent manufacturer of Fine, Industrial and Reagent Chemicals has created a need for three additional Sales Representatives. Positions require a Chemistry or Chemical Engineering degree with at least two years of actual sales experience. Territories available are parts of several midwestern states, Western Pennsylvania and Eastern Ohio, and Metropolitan New York. Basic salary, bonus incentive and strong management development program. Company car provided. Please send confidential resume with salary history and territory preferred to the attention of Sherman L. Tibbets, Personnel Department, J. T. Baker Chemical Co., Phillipsburg, N. J.

Are You The Man for our Chicago District Office? We are looking for a chemical salesman 3 to 5 years experience to sell in Chicago and surrounding states. We manufacture Surface Active Agents with nationwide distribution. Proper compensation including expenses and car allowance. SW-2240, Chemical Week.

MANAGEMENT SERVICES

"In Engineering, It's the People that Count." Engineers and Contractors for the Petroleum and Chemicals Industries. The C.W. Nofsinger Co., 307 East 63rd St., Kansas City 13, Mo.

POSITION WANTED

Production Supervisor, B.S., M.S. in Ch E., 7 yrs. experience process dev. & Super'n., seeks opportunity with small or Med. size chem. Co. PW-2173, Chemical Week.

CONTRACT WORK WANTED

Air Milling—extremely fine particle size in the low micron range. Can handle heat sensitive materials. Experienced personnel-lab control. Storage and drop shipments arranged. Excellent transportation for domestic or export. Central Chemical Corporation, Processing Department, Box 310, Hagerstown Maryland REgent 3-4700.

CHEMICALS WANTED

Surplus Wanted—Chemicals, Pharmaceuticals, Oils, Acids, Plasticizers, Resins, Dyes, Solvents, Pigments, Etc. Chemical Service Corporation, 96-02 Beaver Street, New York 5, N. Y. HANOVER 2-6970.

FOR SALE

\$3,000,000 Liquidation-Chemical Plant at Orange, Texas. Type 316 Stainless Steel Tanks, Kettles, Heat Exchangers, Columns, Stills, Crystallizers, Centrifugals, Pumps, Valves, Etc. Wonderful Values. Send for list. Perry Equipment Corp., 1415 N. 6th St., Philadelphia 22, Pa.

Tank Trailers for Chemicals Stainless Steel—new and used. Hackett Trade Co., Inc. P. O. Box 803, Packers Sta., Kansas City, Kas. MA 1-2363.

1—7'6" x 60" long Rotary Kiln or Dryer, 1/2" welded shell. Complete. Perry Equipment Corporation, 1415 N. Sixth St., Philadelphia 22, Pa.

MISCELLANEOUS

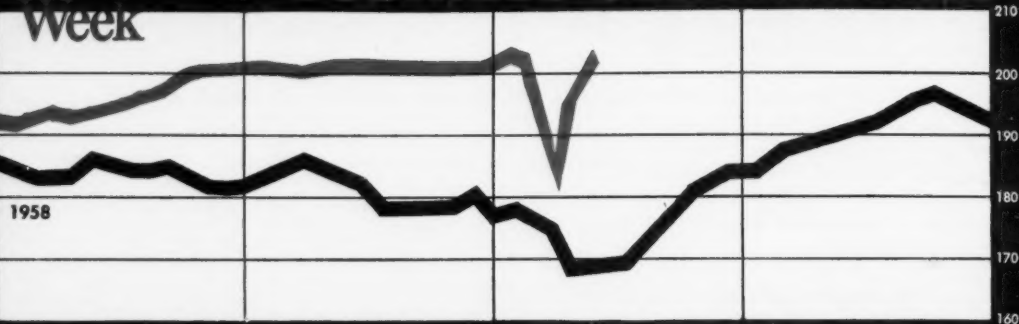
To Employers Who Advertise for Men: The letters you receive in answer to your advertisements are submitted by each of the applicants with the hope of securing the position offered. When there are many applicants it frequently happens that the only letters acknowledged are those of promising candidates. (Others do not receive the slightest indication that their letters have even been received, much less given any consideration.) These men often become discouraged, will not respond to future advertisements and sometimes even question if they are bona fide. We can guarantee that Every Advertisement Printed Is Duly Authorized. Now won't you help keep our readers interested in this advertising by acknowledging every application received, even if you only return the letters of unsuccessful applicants to them marked say, "Position filled, thank you." If you don't care to reveal your identity, mail them in plain envelopes. We suggest this in a spirit of helpful co-operation between employers and the men replying to Positions Vacant advertisements. Classified Advertising Division, McGraw-Hill Publishing Company. "Put Yourself in the Place of the Other Fellow."

Chemical

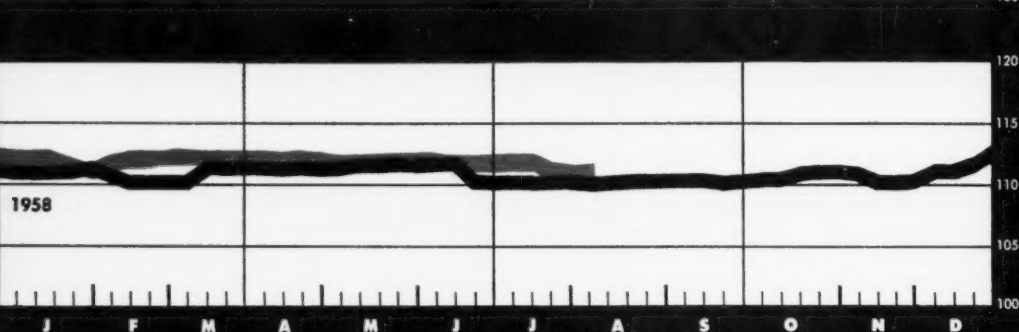
Week

BUSINESS BENCHMARKS

'59 OUTPUT INDEX



'59 PRICE INDEX



AUGUST 1, 1959

WEEKLY BUSINESS INDICATORS

Chemical Week output index (1947-1949=100)
Chemical Week wholesale price index (1947=100)
Stock price index (12 firms, Standard & Poor's)
Steel ingot output (thousand tons)
Electric power (million kilowatt-hours)
Crude oil and condensate (daily av., thousand bbls.)

LATEST WEEK	PRECEDING WEEK	YEAR AGO
203.5	195.5	169.0
111.0	111.0	110.7
59.78	59.65	43.02
374	1,097	1,546
13,415	13,502	12,257
6,858	6,802	6,528

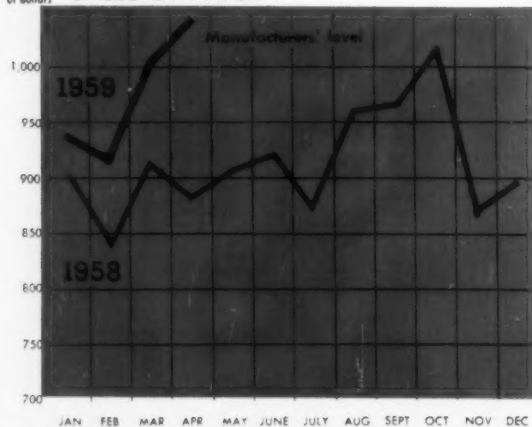
MONTHLY INDICATORS—Wholesale Prices (Index 1947-49=100)

All commodities (other than farm & foods)
Chemicals and allied products
Industrial chemicals
Paint and paint materials
Drugs, pharmaceuticals and cosmetics
Fats and oils (inedible)
Fertilizer and materials

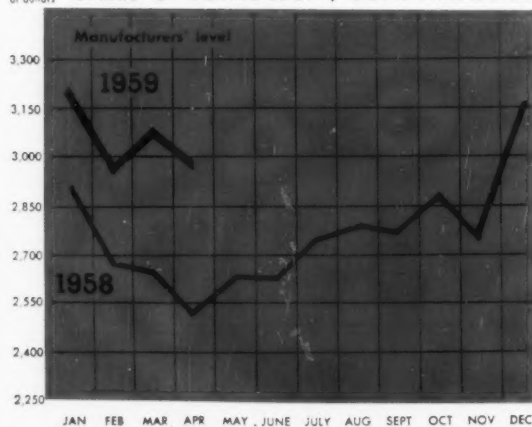
LATEST MONTH	PRECEDING MONTH	YEAR AGO
128.1	128.4	125.3
109.9	110.0	110.7
123.8	123.8	123.5
120.2	120.2	119.2
93.4	93.1	94.5
58.5	60.4	61.9
107.6	107.5	110.3

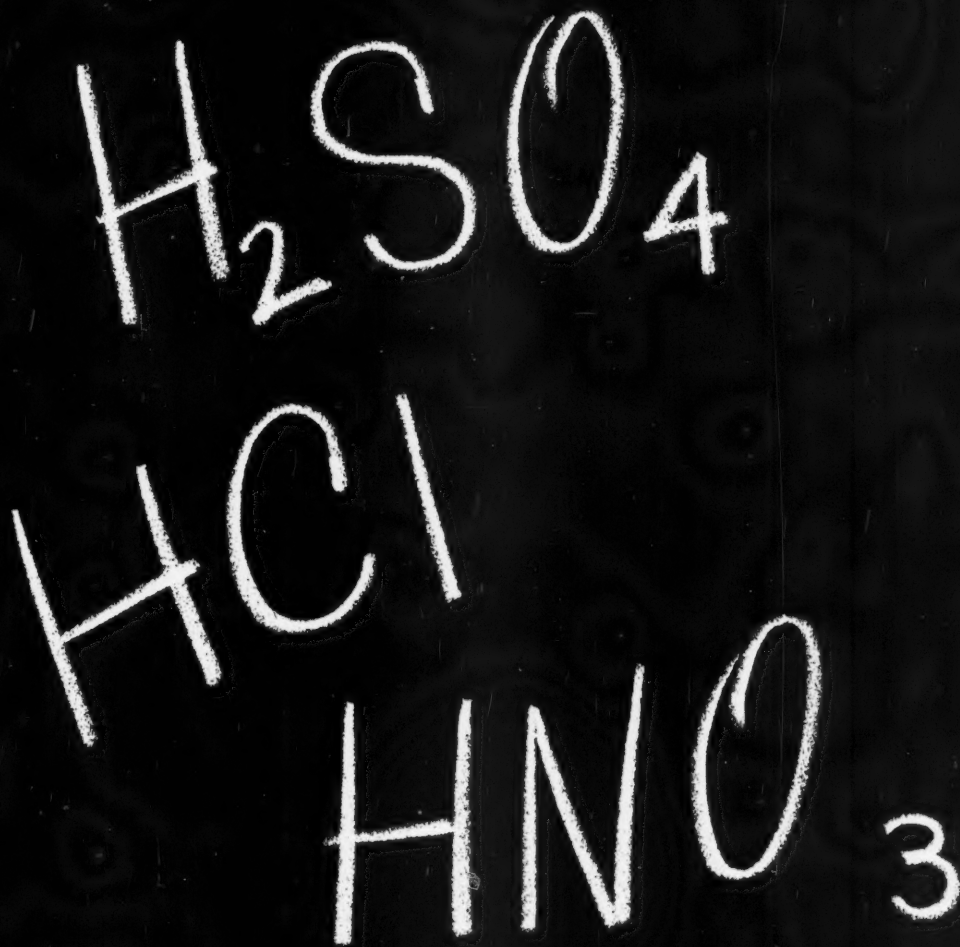
CHEMICAL CUSTOMERS CLOSE-UP

SALES OF PAPER



SALES OF PETROLEUM, COAL PRODUCTS





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Basic service on basic bulk products is of vital importance *to you* in keeping production costs at a minimum . . . and at Cyanamid, quantity and delivery are inherent in basic service on mineral acids.

Centrally located shipping points put our basic acid service close to your consuming plant. A phone call will bring you the right acid, at the right strength, in the package and quantity you desire.

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Battery Electrolyte
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Mixed Acids



AMERICAN CYANAMID COMPANY

PROCESS CHEMICALS DEPARTMENT

30 Rockefeller Plaza, New York 20, New York

In Canada: Cyanamid of Canada Limited, Montreal and Toronto



Pigments on combat duty



The fence in the color photograph above is part of the 2½-mile system of test fences (partially shown at top) at Titanium Pigment Corporation's weathering test station at Sayville, Long Island. Here, TITANOX® white titanium pigments go on "combat duty" under actual weather conditions.

This particular fence is testing house paints, with varying combinations of TITANOX pigments and other ingredients, for staining from hardware. You can see that two of the white panels are discolored by stain,

while the middle one remains clean. This is typical of the careful testing that characterizes our cooperation with many paint formulators. Test fence studies at Sayville are supplemented by studies at other locations, as well as on actual houses and other structures.

TITANOX white pigments undergo comparable evaluation for use in many other products besides paints: in paper, rubber, plastics, ceramics, inks, leather and roofing granules. Titanium Pigment Corporation, 111 Broadway, New York 6, N.Y.; offices and warehouses in principal cities.



TITANIUM PIGMENT CORPORATION

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IN CANADA: Canadian Titanium Pigments Limited, Montreal.

